The PHOTOFACT® Servicer

SET 533 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ JUNE 1961

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This Servicer provides you with essential data on other models or special equipment not covered in standard PHOTOFACT folders. The schematics and supplementary data included here will be of valuable help to you in servicing this equipment.

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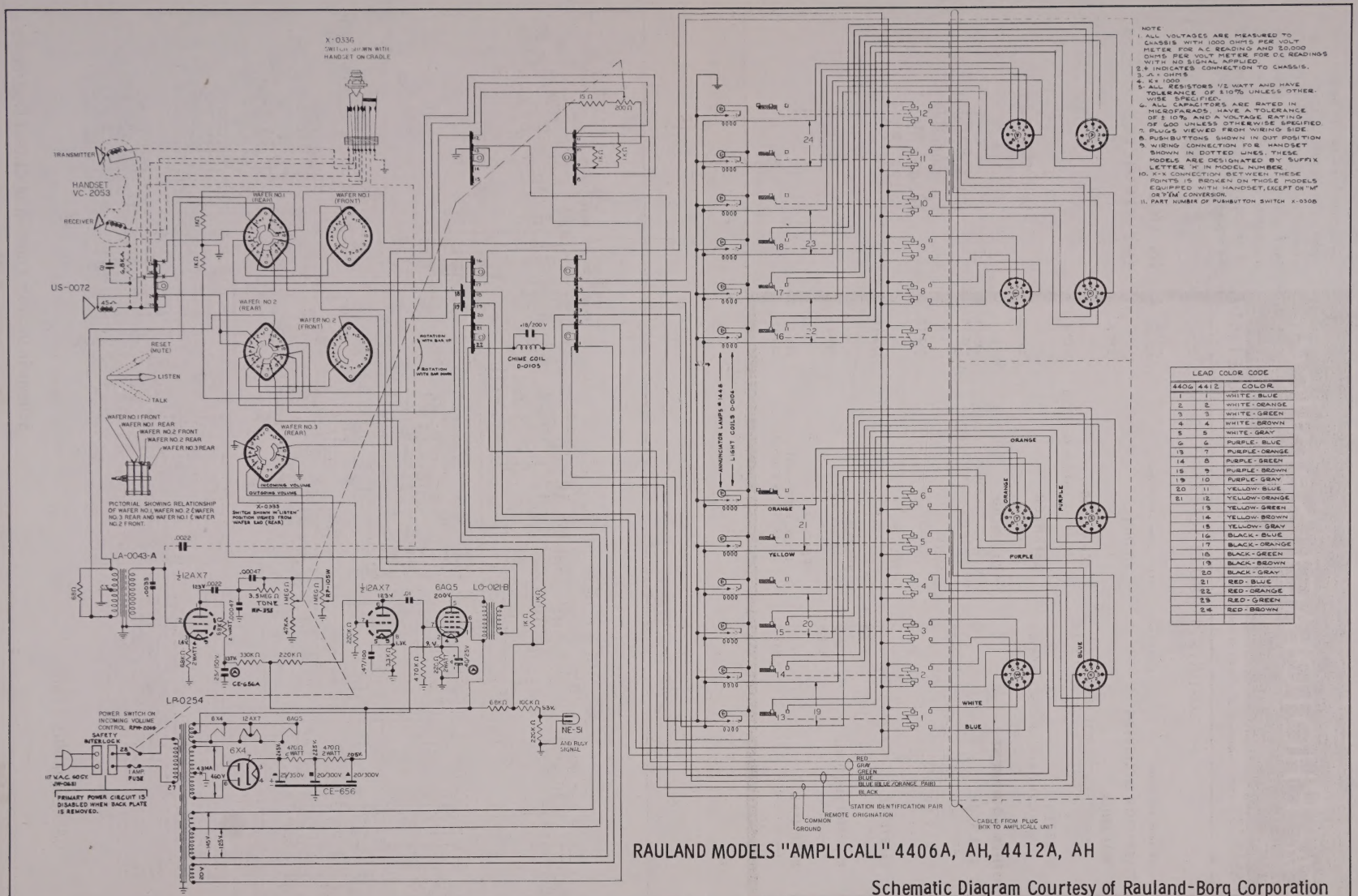
7160

Rauland Models
"Amplicall"
4406A, AH,
4412A, AH

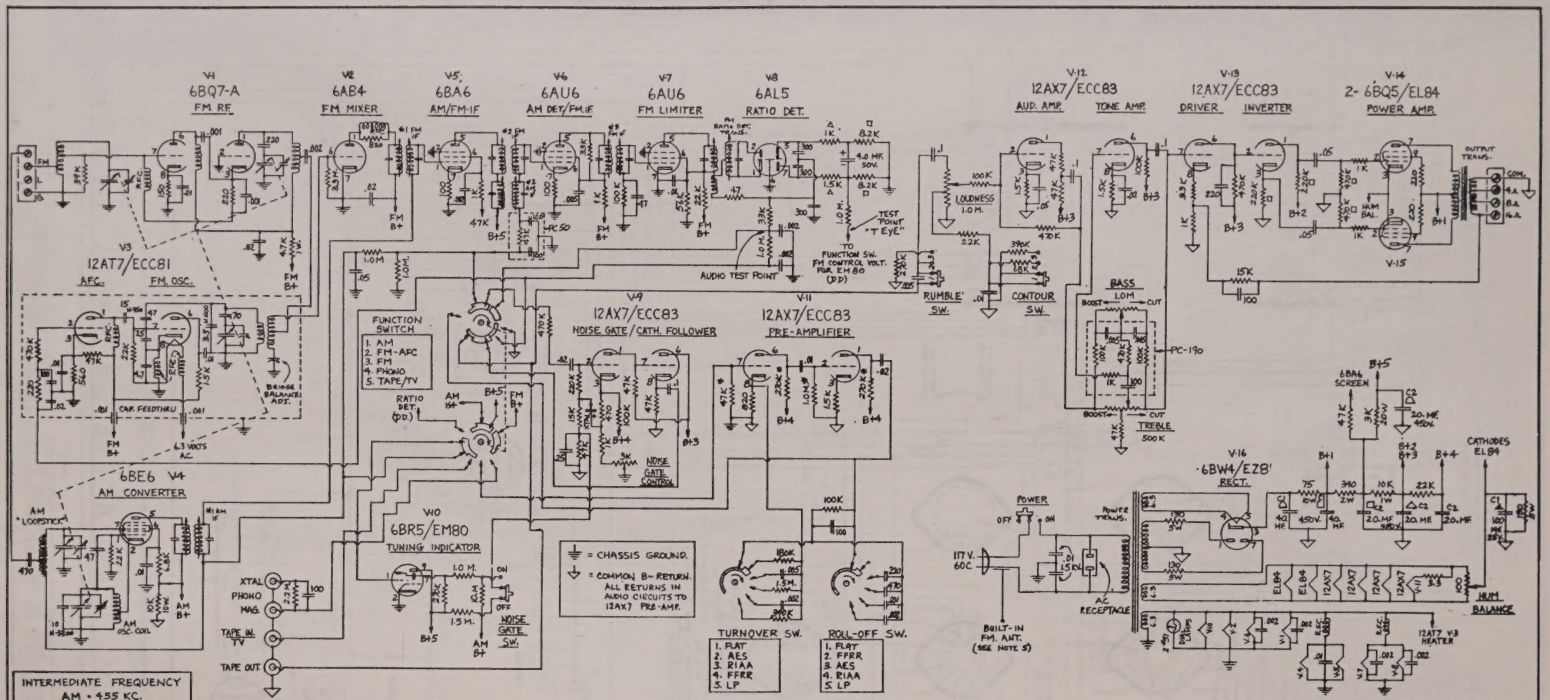


NOTE
1. ALL VOLTAGES ARE MEASURED TO CHASSIS WITH 1000 OHMS PER VOLT METER FOR A.C. READING AND 20,000 OHMS PER VOLT METER FOR D.C. READINGS WITH NO SIGNAL APPLIED.
2. ⏚ INDICATES CONNECTION TO CHASSIS.
3. Ω = OHMS
4. K = 1000
5. ALL RESISTORS 1/2 WATT AND HAVE TOLERANCE OF ±10% UNLESS OTHERWISE SPECIFIED.
6. ALL CAPACITORS ARE RATED IN MICROFARADS, HAVE A TOLERANCE OF ± 10% AND A VOLTAGE RATING OF 600 UNLESS OTHERWISE SPECIFIED.
7. PLUGS VIEWED FROM WIRING SIDE.
8. PUSH-BUTTONS SHOWN IN OUT POSITION
9. WIRING CONNECTION FOR HANDSET SHOWN IN DOTTED LINES. THESE MODELS ARE DESIGNATED BY SUFFIX LETTER 'H' IN MODEL NUMBER.
10. X-Y CONNECTION BETWEEN THESE POINTS IS BROKEN ON THOSE MODELS EQUIPPED WITH HANDSET, EXCEPT ON "M" OR "FM" CONVERSION.
11. PART NUMBER OF PUSHBUTTON SWITCH X-0308

LEAD COLOR CODE		
4406	4412	COLOR
1	1	WHITE - BLUE
2	2	WHITE - ORANGE
3	3	WHITE - GREEN
4	4	WHITE - BROWN
5	5	WHITE - GRAY
6	6	PURPLE - BLUE
13	7	PURPLE - ORANGE
14	8	PURPLE - GREEN
15	9	PURPLE - BROWN
19	10	PURPLE - GRAY
20	11	YELLOW - BLUE
21	12	YELLOW - ORANGE
	13	YELLOW - GREEN
	14	YELLOW - BROWN
	15	YELLOW - GRAY
	16	BLACK - BLUE
	17	BLACK - ORANGE
	18	BLACK - GREEN
	19	BLACK - BROWN
	20	BLACK - GRAY
	21	RED - BLUE
	22	RED - ORANGE
	23	RED - GREEN
	24	RED - BROWN

RAULAND MODELS "AMPLICALL" 4406A, AH, 4412A, AH

Schematic Diagram Courtesy of Rauland-Borg Corporation



VOLTAGE MEASUREMENTS

TUBE	DESCRIPTION	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
V1 6BQ7-A	FM. RF. AMP.	0 95 0	GROUND	0 1 0	** 6.3	GROUND	0 96 0	0 0 0	0 1.0 0	GROUND
V2 6AB4	FM. MIXER	0 145 0	GROUND	** 6.3	———	GROUND	-1.9 -1.3 -1.9	GROUND		
V3 12AT7	FM. OSC./AFC.	0 145 0 -.72 0 -.72		0 285 0	** 6.3	** 6.3	0 135 0	-.35 -1.46 -.35	0 0 0	GROUND
V4 6BE6	AM CONVERTER	-93 -4.9 -.7	0 0 0	GROUND	** 6.3	175 0 0	116 0 0	-.52 -1.8 -.8		
V5 6BA6	AM/FM. IF AMP.	-.5 -1.9 -.8	GROUND	GROUND	** 6.3	175 150 280	109 118 120	1.4 1.25 1.5		
V6 6AU6	AM DET./FM IF. AMP.	-.5 -.7 -.55	GROUND	GROUND	** 6.3	0 138 0	0 138 0	0 .75 0		
V7 6AU6	FM I.F. LIMITER	-.3 -.33 -.3	GROUND	GROUND	** 6.3	0 65 0	0 59 0	GROUND		
V8 6AL5	RATIO DETECTOR	0 -.01 0	0 -.8 0	GROUND	** 6.3	-.15 -.38 -.15	GROUND	-.15 -.41 -.15		
V9 12AX7	NOISE GATE/CATH FOL.	155 160 148	6 5.2 9.5	73 7 10.5	* 6.3 ④	* 6.3 ④	220 215 232	155 160 148	156 161 149	* 6.3 ④
V10 EM80	TUNING INDICATOR	-.52 -.38 -.48	GROUND	———	* 6.3 ⑤	* 6.3 ⑤	———	35 28 46	———	175 150 280
V11 12AX7	PRE-AMPLIFIER.	.71 .70 .74	0 0 0	.5 .5 .5	* 6.3 ④	* 6.3 ④	54 54 .57	0 0 0	.32 .31 .4	* 6.3 ④
V12 12AX7	AUD. AMP./TONE AMP.	128 126 137	-2 -.21 -.18	1.1 1.0 1.2	* 6.3 ③	* 6.3 ③	132 130 140	0 0 0	1.1 1.05 1.15	* 6.3 ④
V13 12AX7	DRIVER/INVERTER	125 126 133	89 88 96	90 89 97	* 6.3 ③	* 6.3 ③	89 88 96	0 0 0		* 6.3 ④
V14 EL84	POWER AMP.	———	0 0 0	11. 10.8 11.5	* 6.3 ④	———	310 305 322			315 310 329
V15 EL84	POWER AMP.	———	0 0 0	11. 10.8 11.5	* 6.3 ④	———	310 305 322			315 310 329
V16 EZ81	RECTIFIER	** 305 305 310	———	329 325 340	* 6.3 ④	* 6.3 ④	———	** 325 325 330	———	———

1. ROTARY SWITCHES SHOWN IN EXTREME COUNTER-CLOCKWISE POSITION AS VIEWED FROM KNOB END.
2. ALL RESISTORS = ½ WATT ±10%, EXCEPT AS OTHERWISE SPECIFIED. RESISTORS INDICATED WITH AN ASTERISK (*) ARE DEPOSITED CARBON TYPE. EQUAL VALUE RESISTORS INDICATED WITH A SQUARE (□) ARE SELECTED PAIRS 2% OF EACH OTHER. RATIO BETWEEN RESISTORS INDICATED WITH A TRIANGLE (△) IS HELD TO ±2%. K = 1000 Ω. M = MEGOHMS.
3. CAPACITANCE VALUES EXPRESSED AS LESS THAN 1 ARE IN MFDS., MORE THAN 1 ARE IN MMFDS, EXCEPT AS NOTED. ALL CERAMIC DISC CAPACITORS ARE 500 VOLT (DC) WORKING UNITS, EXCEPT AS NOTED.
4. ALL VOLTAGE MEASUREMENTS MADE AT 117 VOLTS 60 CYCLE POWER INPUT. DC VOLTAGES TAKEN WITH VACUUM TUBE VOLTMETER (11 MEGS. INPUT IMPEDANCE). REFERENCE = CHASSIS GROUND. WHERE MORE THAN ONE VOLTAGE IS INDICATED, THE FIGURES REPRESENT READINGS TAKEN WITH THE FUNCTION SWITCH IN AM, FM, AND PHONO POSITIONS, RESPECTIVELY. VOLTAGES INDICATED WITH ** ARE AC, REFERRED TO CHASSIS GROUND. VOLTAGES INDICATED WITH * ARE AC WITH RESPECT TO THE ENCIRCLED PIN NUMBER. □ = VARIES WITH NOISE INPUT. △ = DEPENDS UPON POSITION OF CONTROL IN THAT CIRCUIT. ALL READINGS MADE WITH NO SIGNAL INPUT.
5. BUILT-IN FM ANTENNA, WHEN USED, CONNECTS TO "L" ON ANTENNA TERMINAL STRIP, WITH SHORT JUMPER CONNECTED TO FM TERMINAL. WHEN EXTERNAL FM ANT. IS USED, REMOVE JUMPER.

CALBEST MODEL 7160

Schematic Diagram Courtesy of Calbest Electronics

PHOTOFACT® Folder with CIRCUITRACE®

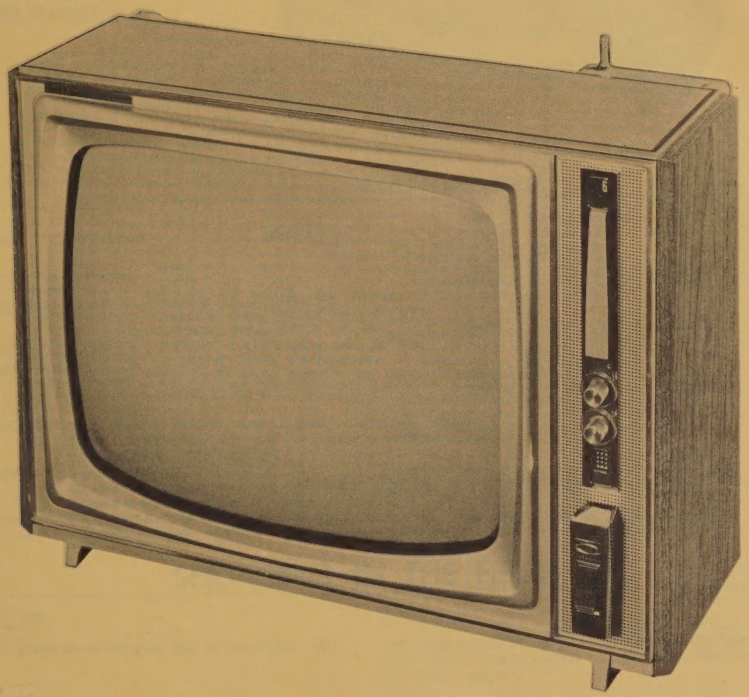
MOTOROLA CHASSIS STS-435, STS-435Y, TS-435, TS-435Y, WTS-435

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MOTOROLA CHASSIS STS-435, STS-435Y, TS-435, TS-435Y, WTS-435



MOTOROLA CHASSIS STS-435, STS-435Y, TS-435, TS-435Y, WTS-435

MODEL A19T2-3 (CH. WTS-435)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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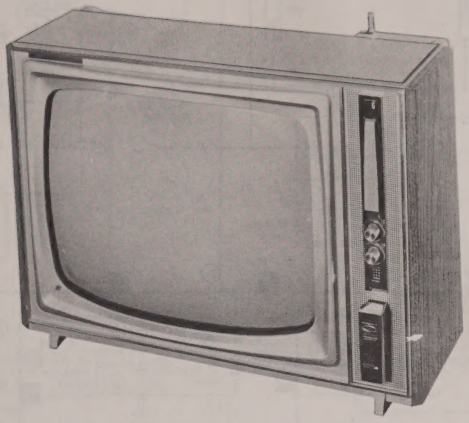
PHOTOFACT® Folder with CIRCUITRACE®

MOTOROLA CHASSIS STS-435, STS-435Y, TS-435, TS-435Y, WTS-435

MOTOROLA CHASSIS STS-435, STS-435Y, TS-435, TS-435Y, WTS-435



CAUTION

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

MODEL A19T2-3 (CH. WTS-435)

TRADE NAME	MOTOROLA MODELS	*TV Chassis	† Remote Control Receiver & Transmitter	VHF Tuner	UHF Tuner
	19P3-1, -2	STS-435		TT-133	
	Y19P3-1, -2	STS-435Y		TT-133Y	VTT-600
	19KI1W, WA; 19KI2M, MA, W, WA; 19KI3CW, CWA; 19KI4M, MA, W, WA; 19KI5CW, CWA; 19TI-3, -4, -5	TS-435		TT-133	
	Y19KI1W, WA; Y19KI2M, MA, W, WA; Y19KI3CW, CWA; Y19KI4M, MA, W, WA; Y19KI5CW, CWA; Y19TI-3, -4, -5	TS-435Y		TT-133Y	VTT-600
	A19T2-3, -4, -5	WTS-435	TR-9	2ATT-133	

* TV CHASSIS CODES A-00 THRU A-04.

† REMOTE CHASSIS CODES A00-1 THRU A01.

MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois
TYPE SET	Television Receiver (WTS-435 TV Chassis with Remote Control)
TUBES	VHF - Fifteen, UHF - Sixteen
POWER SUPPLY	110-120 Volts AC, 60 Cycle
RATING	TV (VHF) with Remote Control - 170 Watts, 1.65 Amp. @ 117 Volts AC (200 Watts, 1.95 Amp. While Tuning) Remote Control Receiver - 11 Watts, .1 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

SAFETY GLASS

The safety glass is an integral part of the picture tube.

FUSE

Remote Control Receiver: A 1/10 Amp. S/B fuse is used for LV supply protection. (For location, see photo page 19.)

FUSE DEVICE

TV: A Circuit Breaker is used for low voltage power supply protection, and may be reset by depressing the reset button. (For location, see "Tube Placement Chart".)

TUNER OSCILLATOR ADJUSTMENTS

To touch up VHF Oscillator, remove rear cover and adjust Oscillator Trimmer.

AGC

No provision is made to vary the AGC on this receiver.

FOCUS

The focus may be varied by connecting the lead from pin 4 of the picture tube to various voltage points. (For location, see photo, page 16.)

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

The Horizontal Frequency Slug is used for the Horizontal Hold. (For location, see "Tube Placement Chart".)

WIDTH

The width may be varied by a Horizontal Size Control. (See "Tube Placement Chart" for location.)

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

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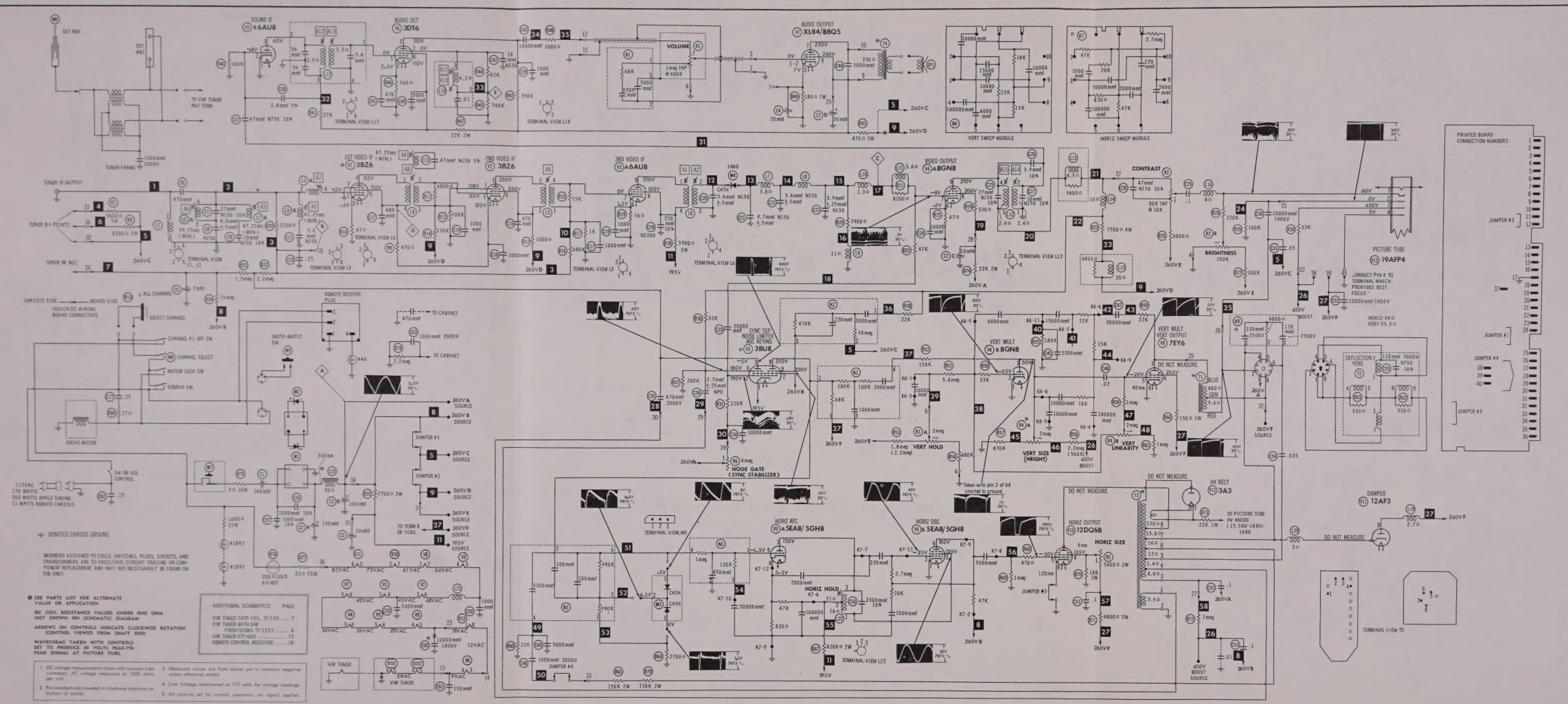
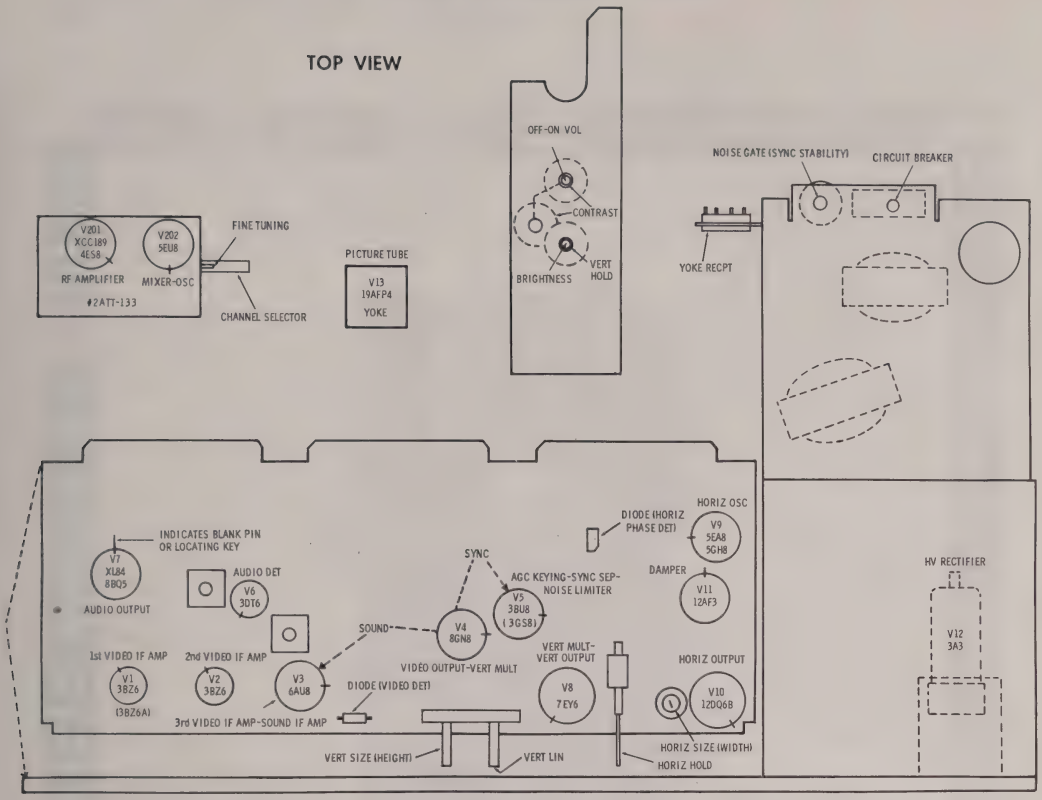
KA639

SET 533 FOLDER 1


SOUND IF V3 6AU8
AUDIO DET V4 3DT6
AUDIO OUTPUT V7 XL84/8BQ5
VOLUME
VERT SWEEP MODULE
HORIZ SWEEP MODULE
TUNER FRAME
TO VHF TUNER ANT TERM
EXT ANT
1ST VIDEO IF V1 3BZ6
2ND VIDEO IF V7 3BZ6
3RD VIDEO IF V8 A6AU8
VIDEO OUTPUT V4 8GN8
CONTRAST
BRIGHTNESS 100K
PICTURE TUBE V13 19AFP4
PRINTED BOARD CONNECTION NUMBERS
JUMPER #1
JUMPER #2
JUMPER #3
JUMPER #4
TUNER IF OUTPUT
TUNER B+ POINTS
TUNER RF AGC
CHASSIS SIDE
BOARD SIDE
INDICATES WIRING BOARD CONNECTORS
SELECT CHANNEL
CHANNEL #1 OFF SW
CHANNEL SELECT
MOTOR LOCK SW
GENEVA SW
DRIVE MOTOR
INSTA-MATIC SW
REMOTE RECEIVE PLUG
TO CABINET
SW ON VOL CONTROL
117VAC 170 WATTS 200 WATTS WHILE TUNING 31 WATTS REMOTE CHASSIS
DENOTES CHASSIS GROUND
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 30 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
ADDITIONAL SCHEMATICS PAGE
VHF TUNER 2ATT-133, TT-133 7
VHF TUNER WITH UHF PROVISIONS TT-133Y 8
UHF TUNER VTT-600 15
REMOTE CONTROL RECEIVER 18
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE
©Howard W. Sams & Co., Inc. 1961
MOTOROLA CHASSIS STS-435, STS-435Y, TS-435, TS-435Y, WTS-435

TV TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

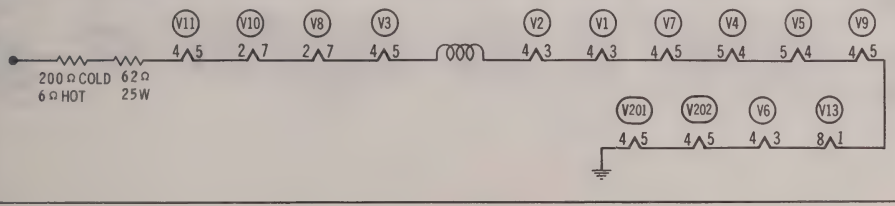
POWER SUPPLY FAILURE
No raster, no sound Circuit Breaker, Rectifiers (B+)

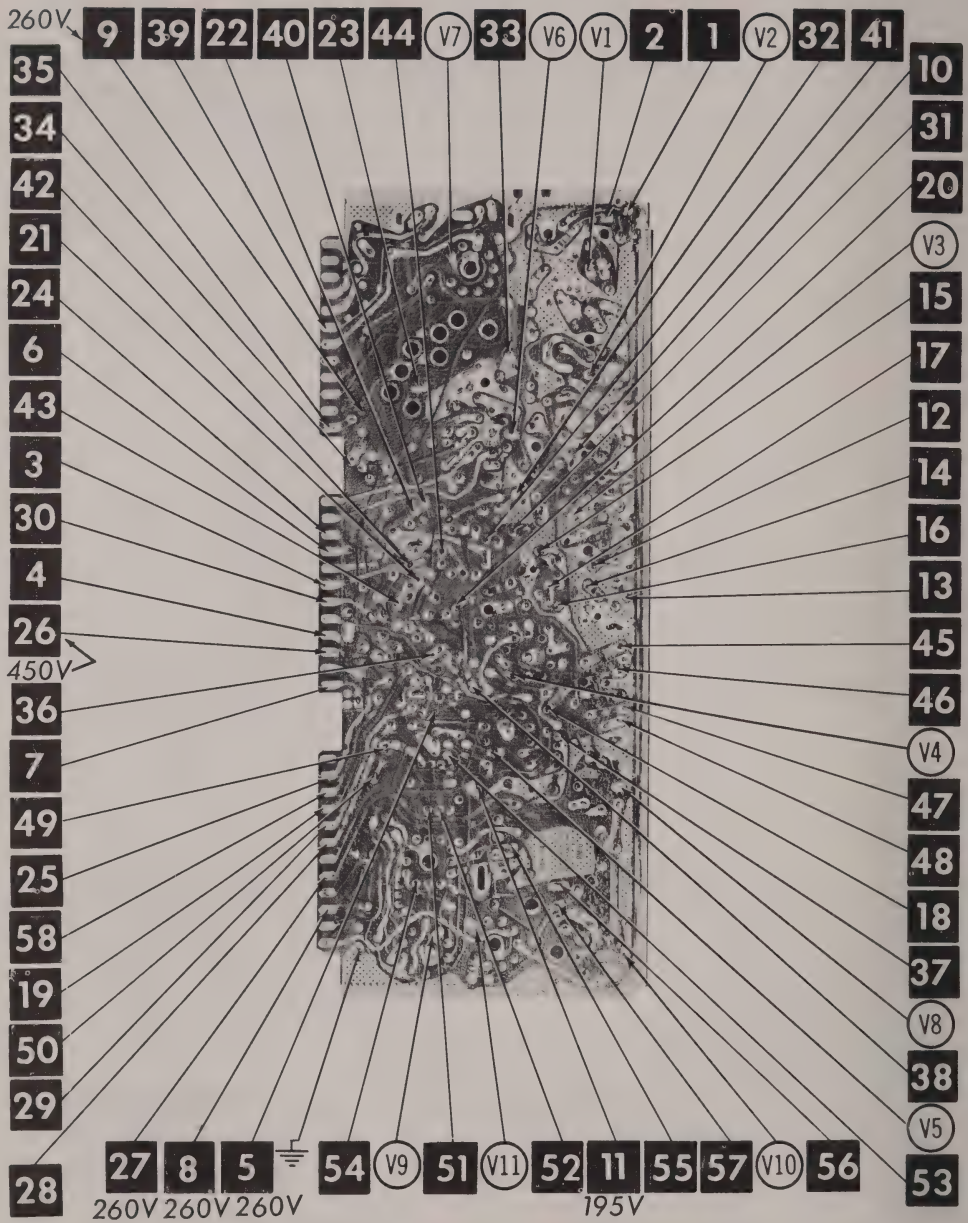
SWEEP FAILURE
No raster, has sound V9, V10, V11, V12, V13
No vertical deflection V4, V8
Poor vert. linearity or foldover V4, V8
Poor horiz. linearity or foldover V9, V10, V11
Narrow picture V9, V10, V11, Rectifiers (B+)
Vert. off freq. V4, V8
Horiz. off freq. Diode (Horiz. Phase), V9

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, Diode (Video Det.), V4
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V14
Has pic, no sound V3, V6, V7
Overloaded picture V5

SYNC FAILURE
No vert. sync V5
No horiz. sync V5
No vert. or horiz. sync V5

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)





A Howard W. Sams CIRCUITRACE® Photo

PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

TV ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Remove the yoke plug to eliminate interference from the Horizontal Sweep Circuit. Connect a 1500 ohm 50 watt resistor from point (A) to chassis. Disable the Tuner Oscillator by grounding the grid (Pin 2) of the Oscillator. Set the Noise Gate control fully counterclockwise. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The generator output lead should be terminated with its characteristic impedance, usually 50 ohms. Connect the negative lead of a 4.5 volt bias supply to point (B). Positive to chassis. Maintain between 2 and 3 volts peak to peak on scope except where otherwise noted.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	High side thru .001mfd to TP2. Low side to chassis.	44.0MC (10MC Swp.)	45.75MC	13	Vert. Amp. thru 47K to point (C). Low side to chassis. (Across Video Det. Load.)	A1, A2	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
2.	High side to ungrounded tube shield floating over Mixer-Osc. Low side to chassis.	"	47.25MC	"	"	A3, A4	Increase scope gain. Remove bias if necessary. Adjust to place marker in trap notch as in Fig. 2. Tune slug at end of coil away from chassis.
3.	"	"	41.25MC	"	"	A5	Adjust to place marker in trap notch as in Fig. 2. Tune slug at end of coil nearest chassis.
4.	"	"	39.75MC	"	"	A6	Adjust to place marker in trap notch as in Fig. 2. Tune slug at end of coil away from chassis.
5.	"	"	41.25MC 42.25MC 44.0MC 45.75MC 47.25MC	"	Vert. Amp. to point (D). Low side to chassis.	Mixer Plate Coil & A7	Set generator for 3 volts peak to peak. Restore 4.5 volts bias. Adjust for maximum gain and symmetry of response similar to Fig. 3 with markers as shown. The Mixer Plate Coil affects the center peak and A7 affects the two outside peaks. Tune slugs at end of coil away from chassis. If a suckout (trap effect) occurs, detune A8 to remove.
6.	"	"	42.25MC 45.75MC	"	Vert. Amp. thru 47K to point (C). Low side to chassis.	A8, A9	Adjust A8 to place 42.25MC marker at 50% or curve as in Fig. 4. Adjust A9 to place 45.75MC marker at 50% on other side. Tune slugs to end of coils nearest chassis. If necessary, retouch Mixer Plate Coil to correct tilt. Retouch A8 and A9 for correct response.

SOUND IF ALIGNMENT

Tune in a strong TV signal and adjust all controls for normal picture and sound. Connect the DC probe of the VTVM to point (E). Common to chassis. Adjust A10 for maximum deflection choosing the one of two peaks that produce the highest voltage. While listening to the sound, retouch A10 for maximum sound and MINIMUM distortion. The top slug (A11) is a preset slug which is set near the top of the coil form and left there.
Change to a very weak signal (this may be done by loosely coupling the antenna lead to the antenna terminals) that produces a hiss in the sound. Adjust A12 and A13 for maximum sound and MINIMUM distortion. Adjust A14 for maximum undistorted sound. If sound is not clear at this time, repeat the above procedure as necessary.

4.5MC TRAP ALIGNMENT

Tune in a strong TV signal and turn the Contrast fully clockwise. Adjust the Fine Tuning until a strong 4.5MC beat pattern is visible. Adjust A15 to find the two points at which the beat pattern is just visible on the screen. Tune the slug to the center of these two points. (Use the MINIMUM amount of inductance that will result in no apparent beat pattern.)

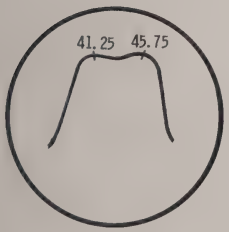


FIG.1

FIG.2

FIG.3

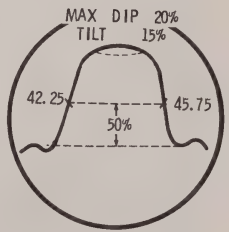


FIG.4

VHF TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
Remove the deflection yoke plug to prevent interference radiation. Connect a 1500Ω 50 watt resistor from pin 3 to pin 5 of the Service Test Receptacle.
DO NOT remove the tuner cover.
Suggested Alignment Tools: A206, A207 ..... GENERAL CEMENT #5000, 5003, 8276, 8290
WALSCO #2512, 2525
A208 thru A213... GENERAL CEMENT #9296, 9297
WALSCO #2546, 2547

VHF RF AND MIXER ALIGNMENT

Connect a clip lead from point ⓣ to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
Preset A206 and A207 so top of screw is .35" above tuner chassis.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K to point ⓓ. Low side to chassis.	A201, A202	Adjust for maximum gain and symmetry of response similar to Fig. 201 with markers as shown.
2.	"	"	"	"	"	"	A203, A204	Adjust for proper bandwidth as in Fig. 201.
3.	"	"	"	"	"	"	A205	Adjust for maximum amplitude and MINIMUM tilt.
4.	"	"	177MC	175.25MC 179.75MC	7	"	A206, A207	Adjust A206 for proper marker position. Adjust A207 for MINIMUM tilt.
5.	"	"	85MC	83.25MC 87.75MC	6	"	A208, A209, A210	Adjust A208 to place 83.25MC marker on or near peak, A209 to place 87.75MC marker on or near other peak and A210 for maximum gain and MINIMUM tilt.
6.	"	"	"	94MC	"	"	A211	Adjust for MINIMUM response at marker or until it just starts to affect the high frequency side of response curve. NOTE: A211 may be adjusted to trap out interference between 85 and 108MC. However, make certain that no part of a desired channel is trapped out.
7.	"	"	79MC	77.25MC 81.75MC	5	"		Check for response similar to Fig. 201. If necessary make compromise adjustment of A208, A209 and A210 for proper curve on each channel.
			69MC	67.25MC 71.75MC	4			
			63MC	61.25MC 65.75MC	3			
			57MC	55.25MC 59.75MC	2			
8.	"	"	57MC	43.5MC 45.5MC	2	"	A212, A213	Adjust A212 for MINIMUM response at 43.5MC marker and A213 for MINIMUM response at 45.5MC marker. Retouch either or both for flat response consistent with MINIMUM amplitude at trap frequencies.

VHF OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

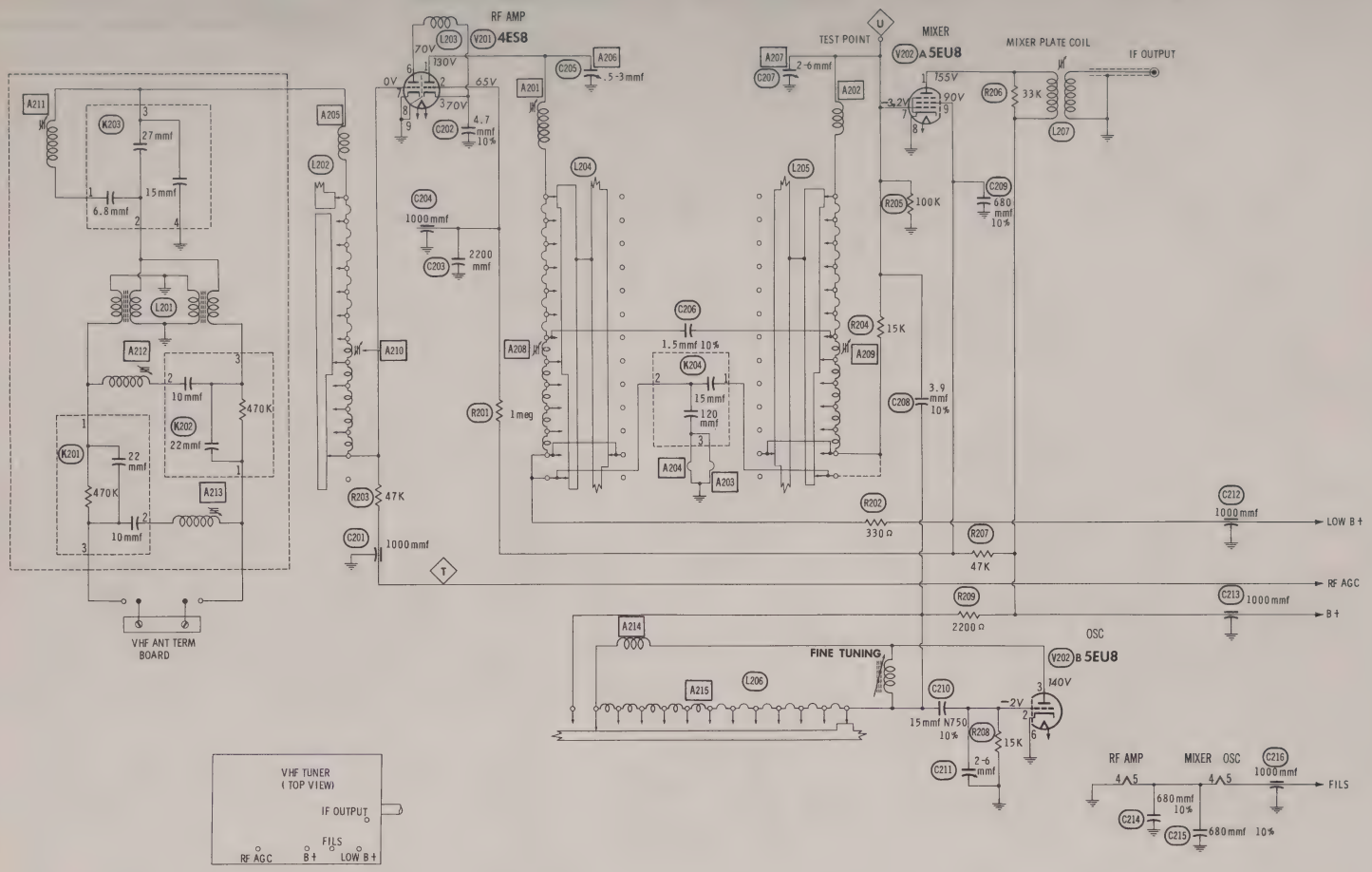
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	215.75MC	13	Vert. Amp. thru 47K across Video Det. load	A214	Set C210 to mid-range and leave there. Adjust to place marker in trap notch as in Fig. 202.
10.	"	"	207MC	209.75MC	12	"		Marker must fall into trap notch on each channel within plus or minus 750KC of specified marker frequency. If not, make compromise adjustment of A214 for all high band channels.
			201MC	203.75MC	11			
			195MC	197.75MC	10			
			189MC	191.75MC	9			
			183MC	185.75MC	8			
			177MC	179.75MC	7			
11.	"	"	85MC	87.75MC	6	"	A215	Adjust to place marker in trap notch as in Fig. 202.
12.	"	"	79MC	81.75MC	5	"		Marker must fall into trap notch on each channel within plus or minus 750KC of specified marker frequency. If not, make compromise adjustment of A215 for all low band channels.
			69MC	71.75MC	4			
			63MC	65.75MC	3			
			57MC	59.75MC	2			

UHF IF ALIGNMENT

Remove the UHF Tuner from the side of the VHF Tuner so that UHF input receptacle of VHF Tuner is accessible. Coils are accessible thru opening in the side of tuner.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Fig. 203	High side thru matching network to UHF input receptacle. Low side to chassis.	44MC (10MC Swp)	41.25MC 45.75MC	UHF	Vert. Amp. thru 47K to point ⓓ. Low side to chassis.	A216, A217	Adjust for maximum gain and symmetry of response similar to Fig. 204 with markers as shown.

SEE PAGE 15 FOR WAVEFORMS



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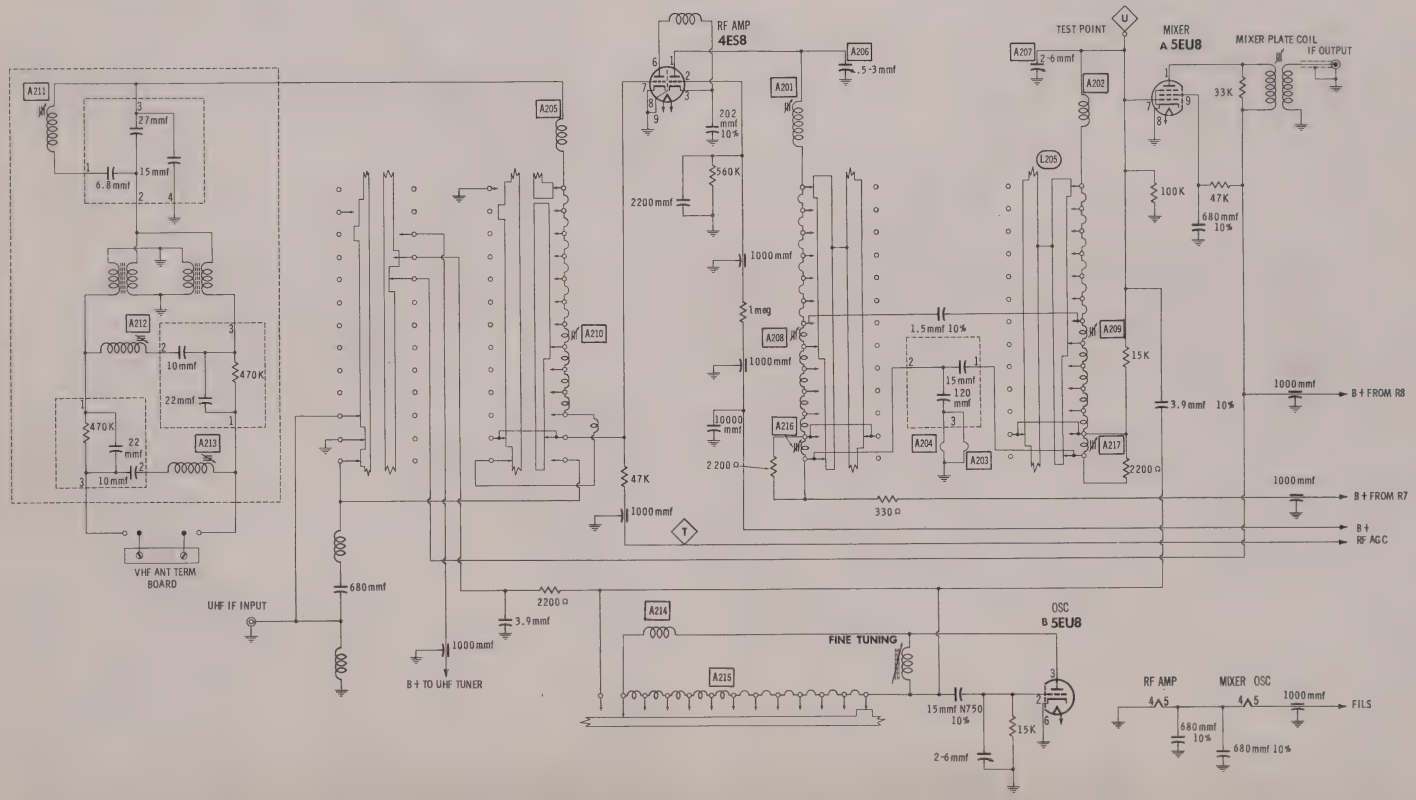
VHF TUNER 2ATT-133, TT-133

MOTOROLA CHASSIS STS-435, STS-435V, TS-435, TS-435V, WTS-435



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VHF TUNER WITH UHF PROVISIONS TT-133Y

TV PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M5	Tuner (2ATT-133)	1V65294A70	VHF (Automatic Tuning), Chassis WTS-435
	Tuner (TT-133)	1U65029A25	VHF, Chassis TS-435
	Tuner (TT-133Y)	[illegible]	VHF with UHF Provisions, Chassis STS-435Y, TS-435Y
	Tuner (VTT-600)	[illegible]	UHF, Chassis STS-435Y, TS-435Y
M6	Antenna	1K753079	JFD REPLACEMENT Type #TA375, Chassis WTS-435
	Antenna	1A742795	JFD REPLACEMENT Type #TA364, Chassis TS-435, Y
M7	Circuit Breaker	80K753396	
M8	Switch	1[illegible]	Channel Selector (Power Tuning)
M9	Switch	[illegible]	Pushbutton (Power Tuning)
M10	Switch	40K754269	All Channels & Select Slide Switch (Power Tuning)
M11	Motor & Gear Box Assembly	1K754083	Includes Motor Lock Switch & Geneva Switch
	Printed Board	1V65296A82	Less Components

WIRING DATA

High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8674
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8375
Antenna Rotor Cable	Use BELDEN No. 8454 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

REMOTE CONTROL RECEIVER PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	• GENERAL ELECTRIC • USE	TYPE	ITEM No.	• RAYTHEON • • SYLVANIA • USE	TYPE
V14	1st 40KC Amp. - Rectifier	6U8A (6U8) *	V15	2nd 40KC Amp. - Relay Control Amp.	6GH8

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C84A B	≤10 ≤10	250 250	23KT5172	AFH3-25	B0200	FP231	TMD-2230	TVL-2510	
C85	12	250		PRH2560	BR1235	TC53	TD-12-250	TVA-1506	①

① Some versions use 10mfd ② 250V (Part #23C65808A02).

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No	RATING		REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C66	220	10%		IX-220	DD-22	L10T22	CCD-221	GP322	10TS-T22
C67	10000			BPD-01	DD-103	BYA10S	CCD-103	B-110	5HK-S10
C68	25	50V		P25SN-25		CUB2P25	1DP-3-254	GFM-2025	2TM-P22
C69	330	10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C70	10000			BPD-01	DD-103	BYA10S	CCD-103	B-110	5HK-S10
C71	10000			BPD-01	DD-103	BYA10S	CCD-103	B-110	5HK-S10
C72	220	10%		DI-220	DD-22	L10T22	CCD-221	GP223	10TS-T22
C73	3300			BPD-0033	DD-332	BYA10D33	CCD-332	B-233	5HK-D33
C74	1000			BPD-001	DD-102	BYA10DL	CCD-102	B-210	5HK-D10
C75	25	100V		P25SN-25		CUB2P25	1DP-3-254	GFM-2025	2TM-P25
C76	05	200V		P25SN-05	DD-503	CUB2S5	4DP-3-503	GFM-415	2TM-S50
C77	.25	600V		P65SN-25		CUB6P25	6DP-5-254	GFM-6025	6TM-P25

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA MOTOROLA PART No	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R81A B	10K Shaft	½	18D65216A07	TT-14 Not Req.	B47-10K-S Not Req.	B11-115 T164	TA14L Not Req.	Range Control

REMOTE CONTROL PARTS LIST (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA IRC PART No	WORKMAN TV PART No.	REMARKS
R82	1meg			
R83	10K			
R84	2.2meg			
R85	1meg			
R86	2.2meg			
R87	560K			
R88	100K			
R89	1meg			
R90	1meg			
R91	180K			
R92	[illegible]			
R93	1000Ω 2W			

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA MOTOROLA PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No	NOTES
L24	1st 40KC	24K751945					
L25	2nd 40KC	24K751945					

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	REPLACEMENT DATA MOTOROLA PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T5	117V ② .1A	140V ② .010A DC Tap ② 6.3V ② 1A	25K751685-J ①				R-30X ②	① Alternate Part #25K751685. ② Drill new mounting hole(s).

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA MOTOROLA PART No. FUSE	MOTOROLA PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M12	N	1/10A 250V S/B	65K751988	9K743152	333, 100 (N 1/10A 250V S/B)	346008	N 1/10	HN 0-3/10

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA MOTOROLA PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
M13	*	48K751725 *				* Selenium Diode (AGC)
M14	+	48K751724 +	6GX1 +			+ Dual Selenium, Common Anode Type

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M15	Relay	80K753598	Channel Change
M16	Microphone	50C751726	Includes Cable and Plug

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors

VHF TUNER PARTS LIST AND DESCRIPTIONS

2ATT—133

TUBES

ITEM No.	• GENERAL ELECTRIC • USE	TYPE	ITEM No.	• RAYTHEON • • SYLVANIA • USE	TYPE
V201	RF Amp.	XCC189/6ES8	V202	Mixer - Osc.	5EU8

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	1000			EF-001	MFT-1000		CCF-102	CT280A	
C202	4.7	10%		NPO-SI 4.7	TCZ-4R7	C10Y47C	CCTO-4R7	CNO-547	10TCC-Y47
C203	2200			BPD-0022	DD-222	BYA10D22	CCD-222	B-222	5HK-D22
C204	1000		#21K751384		ZB-102				
C205	.5-3				829-3		CV-1	CT565	
C206	1.5	10%		NPO-SI 1.5	TCZ-1R5	C10Y15C		CNO-515	10TCC-Y15
C207	2-6				829-6		CV-3	CT563	
C208	3.9	10%	#21R13891						10TCC-Y39
C209	680	10%		DI-680	DD-681		CCD-681	GP368	10TS-T68
C210	15	N750 10%		D7N-15	D7N-15	C10Q15U	CCTU-Q15	CN7-415	10TCU-Q15
C211	2-6				829-6		CV-3	CT563	
C212	1000			EF-001	MFT-1000		CCF-102	CT280A	
C213	1000			EF-001	MFT-1000		CCF-102	CT280A	
C214	680	10%		DI-680	DD-681		CCD-681	GP368	10TS-T68
C215	680	10%		DI-680	DD-681		CCD-681	GP368	10TS-T68
C216	1000			EF-001	MFT-1000		CCF-102	CT280A	

Motorola Part Number.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA IRC PART No	WORKMAN TV PART No.	REMARKS
R201	1meg			
R202	330Ω			
R203	47K			
R204	15K			
R205	100K			
R206	33K			
R207	47K			
R208	15K			
R209	2200Ω			

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MOTOROLA PART No.	REPLACEMENT DATA
K201	40KC Filter	10mmf, 22mmf, 470K	51C747535	Centralab PC-360
K202	40KC Filter	10mmf, 22mmf, 470K	51747535	Centralab PC-360
K203	Antenna Coupling	6.8mmf, 15mmf, 37mmf	51K751641	Centralab PC-365
K204	RF Coupling	15mmf, 120mmf	51K752032	

COILS (RF-IF)

ITEM No.	USE	MOTOROLA PART No.	NOTES
L201	Ant. (Ass'y)	1V751564	Channel 2-13, Includes Wafer Assembly
L202	Antenna	1V752254A75	
L203	RF Choke	24K752361	
L204	RF	1V751563	Channel 2-13, Includes Wafer Assembly
L205	Mixer Grid	1V751562	"
L206	Osc.	1V8907LA57	"
L207	Mixer Plate	24K747838	

TV PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No	* GENERAL ELECTRIC * USE	TYPE	ITEM No	* RAYTHEON * * SYLVANIA * USE	TYPE
V1	1st Video IF Amp.	3BZ6 (3BZ6A) *	V8	Audio Det.	3DT6
V2	2nd Video IF Amp.	3BZ6	V7	Audio Output	XL84/6BQ6
V3	3rd Video IF Amp.- Sound IF Amp.	[illegible]	V8	Vert. Mult. - Vert. Output	7EY6
V4	Video Output - Vert. Mult.	[illegible]	V9	Horiz. AFC - Horiz. Osc.	5EA8/5GH8
V5	AGC Keying - Sync Sep. - Noise Limiter	3BU8 (3G8) *	V10	Horiz. Output	12DQ6B
			V11	Damper	12AF3
			V12	HV Rectifier	3A3

* Alternate

PICTURE TUBE

ITEM No	REPLACEMENT DATA: MOTOROLA PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
V13	19AFP4		19AFP4 ①		19AFP4 ③	① Aluminized ③ Silver Screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	VOLT.	REPLACEMENT DATA: MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	140	150	23 KT51011	AFH51-23-05	XA0355	FP140-5	TMS-1480	TVL-1430	
C2A	450	300	25 KT51248	AFH54-56-94, 9-00025	[illegible]	FP423.5	TMT-3447	TVL8-4887.3*	
B	200	300		[illegible]	BRH3035		TD-30-350		
C	10	300							
D	30	300							
C3	10	300	23 KT51719	PRS8320	BH1045	TC52	TD-10-450	TVA-1604	
C4	20	25	23 KT51019	BCD25020	BBR20-25	TT25X20	TD-20-150	TVA-1305.5	
C5	2	20	21 KT53205	PRS300	BBR3-50	TC302	TD-2-25	TVA-1201	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REMARKS	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C6	470			DE-470	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C7	01	N150 10%	#21R119696			*	*		10TCP-Q27
C8	6.8	N150 ±.5mmf	#21R128576			*	*		10TCP-V68
C9	18	N150 10%	#21R120578			*	*		10TCP-Q18
C10	25	50V	P288N-25			CUB2P25	1DP-3-254	GEM-3025	ZTM-P25
C11	5.6	N150	#21R128194			*	*		10TCP-V56
C12	680			BPD-00068	DD-681	BYA10T68	CCD-681	B-368	10TS-T68
C13	47	N150 5%	#21R123823			*	*		10TCP-Q47
C14	1000			BPD-001	DD-102	BYA10I1	CCD-102	B-210	5HK-D10
C15	470			BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C16	1000			BPD-001	DD-102	BYA10I1	CCD-102	B-210	5HK-D10
C17	1000			BPD-001	DD-102	BYA10I1	CCD-102	B-210	5HK-D10
C18	220	N2200 10%	#21R131273			*	*		
C19	1000			BPD-001	DD-102	BYA10I1	CCD-102	B-210	5HK-D10
C20	5.6	N150 ±.5mmf	#21R128194			*	*		
C21	4.7	N150 ±.5mmf	#21R129735			*	*		10TCP-V50
C22	5.6	N150 ±.5mmf	#21R129734			*	*		
C23	3.9	N150 ±.25mmf	#21R129736			*	*		
C24	10000			BPD-01	DD-103	BYA10I3	CCD-103	B-310	5HK-S10
C25	27	N150 10%	#21R129733			*	*		10TCP-Q27
C26	3.3	10%				C10V4C	*		10TCC-Y33
C27	10	N150 10%	#21R128096			*	*		10TCP-Q10
C28	47	N150 10%	#21R134471			*	*		10TCP-Q47
C29	.1	400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C30	10000	1400V		DAC-37	DD8-103	HVE16S1	16DP-3-103	UAC-110	BL-S10
C31	.05	400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C32	10000	1400V		DAC-37	DD8-103	HVE16S1	16DP-3-103	UAC-110	BL-S10
C33	20000			BPD-02	DD-203	BYB5S2	5CCD-203	B-320	5HK-S20
C34	10000			BPD-01	DD-103	BYA10S1	CCD-103	B-310	5HK-S10
C35	470	2000V		HVD-30-470	DD30-471	HVB20T47	3CCD-471	2HV-347	30GA-T47
C36	2.7	NPO ±.25mmf		NPO-DI 2.7		C10V3C	*		10TCC-Y27
C37	47	N750 10%		N750-DI 47	DTZ-47	C10Q47U	CCTN-470	CNT-447	10TCU-Q47
C38	2.4	5%		NPO-SI 3.2	TCZ-3R2	C10Y22C	CCTO-522	CNO-522	10TCC-Y22
C39	1000			BPD-001	DD-103	BYA10I1	CCD-102	B-210	5HK-D10
C40	5000			BPD-005	DD-502	BYA10D5	CCD-502	B-350	5HK-D50
C41	470			BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C42	18	N330	#21R129733			*	*		10TCP-Q18
C43	10000			BPD-01	DD-103	BYA10I3	CCD-103	B-310	5HK-S10
C44	5000	2000V			DD30-502	HVC20S	3CCD-502	2HV-250	BL-D50
C45	2200			BPD-022	DD-222	BYA10D22	CCD-222	B-222	5HK-D22
C46	.02	600V		P688N-02	DD-203	CUB6S2	6DP-3-203	GEM-612	6TM-S20
C47	.02			BPD-02	DD-203	BYB5S2	5CCD-203	B-120	5HK-S20
C48	1000	2000V		HVD-30-1000	DD30-103	HVB30D1	3CCD-102	2HV-210	BL-D10
C49	5000			BPD-005	DD-502	BYA10D5	CCD-502	B-350	5HK-D50
C50	3300	10%		1464-0033		DD33	CCD-332	J-330	5HK-D33
C51	.1	400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C52	.1	600V		P688N-1	DF-104	CUB6P1	6DP-4-104	GEM-601	6TM-P10
C53	.1	600V		P688N-1	DF-104	CUB6P1	6DP-4-104	GEM-601	6TM-P10
C54	.035	400V		P488N-033		CUB4S3	6DP-3-333	GEM-6133	6PS-S35
C55	150	3000V	HT50 10%						
C56	1000	10%		DI-1000	DD-102	PM8DI	CCD-102	GP2D	10TS-D10
C57	1000	10%		DI-1000	DD-102	PM8DI	CCD-102	GP2D	10TS-D10
C58	1000			BPD-001	DD-102	BYA10I1	CCD-102	B-210	5HK-D10
C59	1000			BPD-001	DD-102	BYA10I1	CCD-102	B-210	5HK-D10
C60	10000	1400V	Note 1	DAC-37	DD8-103	HVE16S1	16DP-3-103	UAC-110	BL-S10
C61	150			DI-150	DD-151	L10T15	CCD-151	B-315	10TS-T15
C62	.15	400V		P488N-15		CUB4P15	4DP-4-154	GEM-4015	
C63	1000	2000V		HVD-30-1000	DD30-103	HVB20D1	3CCD-102	2HV-210	BL-D10

\# Motorola Part Number
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

Note 1. Not used in chassis TS-435A thru A-03.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS - IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg 600K Tap	½	18D65083A04	ABT-74	A47P5-1meg	B10-137X		Volume
B	Shaft			AK-33	RB-3/5	SK9		
C	Switch			KR-1	SWE-13	T6-1		Power Off-On
R2	30K	½	18K75309					Contrast
R3A	10K Tap 2meg	½	18D65082A05	F1-67	(RTV-739		■ (	Vert. Hold
B	100K			R2-31				Brightness
R4A	2meg	½	18K75441A ①					Vert. Size (Height)
B	2meg							Vert. Linearity
R5	5000Ω	2(WW)	17C75305				PF15K	Horiz. Sine
R6	4meg	½	18K75366	TT-86	B47-5meg-S	HLC4	PTA5L	Noise Gate (Sync Stability)

① Some versions may use 4meg Height, 2meg Vert. Linearity (Part #18K754277).
■ "STA-LOC" Equivalent: FA2EL, RU15L, OS1S5, IS1S25.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise stated.

ITEM No.	RATING	REPLACEMENT DATA: IRC PART No	WORKMAN TV PART No	REMARKS
R7	5600Ω 5W	PW5-5600	5G-5600	
R8	3200Ω 3W	PW3-8200	3G-8200	
R9	470Ω			
R10	47Ω			
R11	6800Ω			
R12	1000Ω			
R13	100K			
R14	120K			
R15	15K			
R16	680K			(2.2meg) ▲
R17	1000Ω			
R18	3300Ω 3W	PW3-3300	3G-3300	
R19	56Ω			(560K) *
R20	3900Ω			
R21	820Ω			
R22	47K			
R23	7500Ω 4W	PW5-7500	5W-SQ-7500	
R24	330Ω			
R25	47Ω			
R26	6800Ω			
R27	100K			
R28	220K			
R29	100K			
R30	33K			
R31	220K			
R32	2.2meg			
R33	1.5meg			
R34	15meg			
R35	2700Ω 3W	PW3-2700	3W-SQ-2700	
R36	33K			
R37	200K			
R38	22K			
R39	2200Ω			
R40	100K			
R41	27K			
R42	390K			
R43	470Ω 3W	PW3-470	3W-SQ-470	

ITEM No.	RATING	REPLACEMENT DATA: IRC PART No	WORKMAN TV PART No	REMARKS
R44	82K			
R45	560K			
R46	560Ω			
R47	22K 2W			
R48	100Ω			
R49	180Ω 1W			
R50	33K			
R51	5.6meg			
R52	150K			
R53	1.6meg			
R54	680K			
R55	180K			
R56	2.2meg			
R57	470K			
R58	1meg			
R59	22K			
R60	150Ω 1W			
R61	1meg			
R62	330Ω			
R63	330Ω			
R64	2700Ω			
R65	150K 2W			
R66	22K			
R67	8200Ω 2W			
R68	470Ω			
R69	1meg			
R70	18K 2W			
R71	6800Ω 3W	PW3-6800	3G-6800	
R72	1meg			
R73	22K 1W			
R74	22K 2W			
R75	5Ω 10W	PW10-5.0Ω	10W-SQ-5Ω	
R76	200Ω (Cold)			#6K746412 #17K754330
R77	53Ω 25W			
R78	2.2meg			
R79	150K 2W			
R80	27Ω			

▲ Used in Chassis stamped CS-B (Control Strip Section Subchassis).
* Alternate Value.
\# Motorola Part Number.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MOTOROLA PART No.	REPLACEMENT DATA
K1	Volume Comp. (Tone)	3300mmf, 5000mmf, 68K	51K753304	
K2	Sync Sep. Grid	220mmf, 5000mmf, 470K, 10meg	51C751985	
K3	Vert. Integrator	1000mmf, 2000mmf, 68K, 100K, 100K	51K753818	
K4	Vert. Sweep	6000mmf, 10000mmf, 10000mmf, 10000mmf, 15000mmf, 10000mmf, 15K, 18K, 22K	51K753520	
K5	Horiz. Phase	100mmf, 100mmf, 3300mmf, 390K, 390K	51K753307	
K6	Horiz. AFC Grid	450mmf, 120K, 1meg	51K753308	
K7	Horiz. Sweep	220mmf, 1000mmf, 2000mmf, 5000mmf, 50000mmf, 100000mmf,	51K754390 Note 1	
K8	Horiz. Defl. Filter (Yoke)	820Ω, 20K, 47K, 47K, 2.7meg 120mmf (2500V), 120mmf (2500V)	51K748304 Note 2	

Note 1. Chassis TS-435A-00, -01 use Unit #51K754365 (with external 1000mmf capacitor and 20K resistor from pin #9).
Note 2. Chassis stamped LV-A (Low Voltage Section Subchassis) use individual components in this application.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No	NOTES
L1	RF Choke	24K754319					
L2A	39.75MC Trap	24C655T1A01				TG233	
B	47.25MC Trap						
L3A	41.25MC Trap	24K754006				TG234	
B	1st Video IF						
L4A	2nd Video IF	24K754008				TG235	
B	47.25MC Trap						

COILS (RF-IF) (cont)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	NOTES
L5	3rd Video IF	24C751953					①Includes 8200Ω Resistor
L6	4th Video IF	24C751954					
L7	RF Choke (9.1uh)	24K753543	BL-566	4512	RTC-8523	T880	②Includes 5600Ω Resistor
L8	RF Choke (1.8uh)	24K753544	BC-562	9310-18	RTC-8516	T856	
L9	Peaking (500uh)	24K751487	TV-188	6174	RTC-8592	T353	③Includes 6800Ω Resistor
L10	RF Choke (6.5uh)	24R131286				TA810	
L11	Peaking (100uh)	24K754004 ①	TV-194	6112	RTC-8574	T341	
L12A	4.5MC Trap	24D752139				TG236	
B	1st Sound IF						
L13	Peaking (240uh)	24K753479 ②	TV-188 †	6181 †	RTC-8598 †	T346 †	†Parallel with 5800Ω Resistor.
L14	Peaking (500uh)	24K751487	TV-188	6174	RTC-8592	T353	▲Parallel with 5800Ω Resistor.
L15	Peaking (680uh)	24K754003 ③	TV-207 ▲	6156 ▲	RTC-8588 ▲	T357 ▲	
L16	Peaking (100uh)	24K750835	TV-194	6112	RTC-8574	T341	
L17	2nd Sound IF	24D752140				TG237	
L18	Quadrature	24D752238				TG238	
L19	RF Choke (7.5uh)	24K751878	BC-566	4611	RTC-8521	T960	
L20	RF Choke (7.5uh)	24C753509	BC-566	4611	RTC-8521	T960	
L21	Fil. Choke (1.3uh)	24K743287	BC-562	4604	RTC-8516	T856	

COILS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	Merit PART No.	Miller PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	Workman TV PART No.
L22	Horiz. Osc.	24K754010							

FILTER CHOKE

ITEM No.	RATINGS: CURRENT (Measured)	DC RES.	INDUCTANCE @ CURRENT 1000 (°C)	REPLACEMENT DATA: MOTOROLA PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
L23	.300A	30Ω	.8 Hy.	25K751797BA ①	C-4084	C-2343 ②		C-28X	① Alternate Part #25K751797. ② Drill new mounting hole(s).

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	Merit PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	Vert. Output	28K754329-AB	A-2854	VO-35		26S73	A-134X	
T2	Alt. Vert. Output	25K754329					Y-53 ①②	Y-62-1 ③
	Yoke (Horiz.18.4MH) (10°) (Vert. 30.5MH)	24D65616A02-R		PCM-1834 ①②				
	Alt. Yoke	24D65616A02						
	Rear Cover and Centering Device	59C751843						
	Yoke Clamp	42A742819						
T3	Horiz. Output	24C65410A02-B-1						
	Alt. Horiz. Output	24D65410A02						

① Requires new rear cover and centering device.
② Use original yoke damping network.
③ May require use of original vert. damping resistors.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: MOTOROLA PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T4	6000Ω	6-8Ω	25K754288-AB ①					① Alternate Part #25K754288.

SPEAKER

ITEM No.	TYPE: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: MOTOROLA PART No.	QUAM PART No.	NOTES
SP1	3" x 5" 5"[x 7"] 6" x 9"	PM PM PM	6-8Ω 6-8Ω 6-8Ω	50C752927 ① 50D751192 ② 50D65696A03 ③	35A05Z8	① Used in Models A19T2-3, -4, -5, 19T1-3, -4, -8, Y19T1-3, -4, -5, 19T3-1, -2, Y19T3-1, -2 ② Used in Models 19K14M, MA, W, WA, Y19K14M, MA, W, WA, 19K15CW, CWA, Y19K15CW, CWA, 19K21W, WA, Y19K21W, WA ③ Used in Models 19K12M, MA, W, WA, Y19K12M, MA, W, WA, 19K13CW, CWA, Y19K13CW, CWA

POWER RECTIFIERS

ITEM No.	RATING: CURRENT (Measured)	REPLACEMENT DATA: MOTOROLA PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.300A	48K754205	1N1763	40H	SR500	
M2	.300A	48K754205	1N1763	40H	SR500	

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: MOTOROLA PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
M3		48C751656 *	6GC1 *			* Horizontal Phase Detector, Dual Selenium Diode, Common Cathode ♦ Video Detector, Pigtail
M4	1N60 *	48K747548 *		1N60 *	1N60 *	

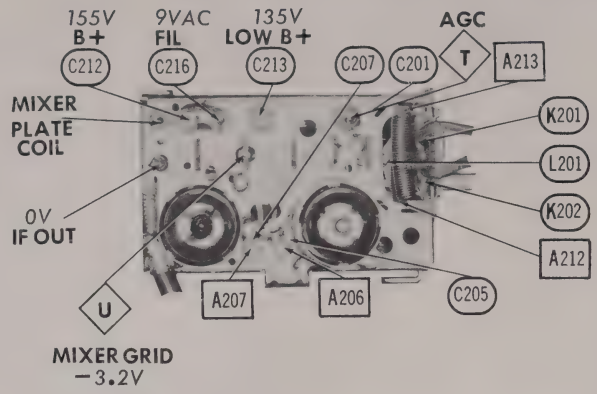
CABINETS & CABINET PARTS

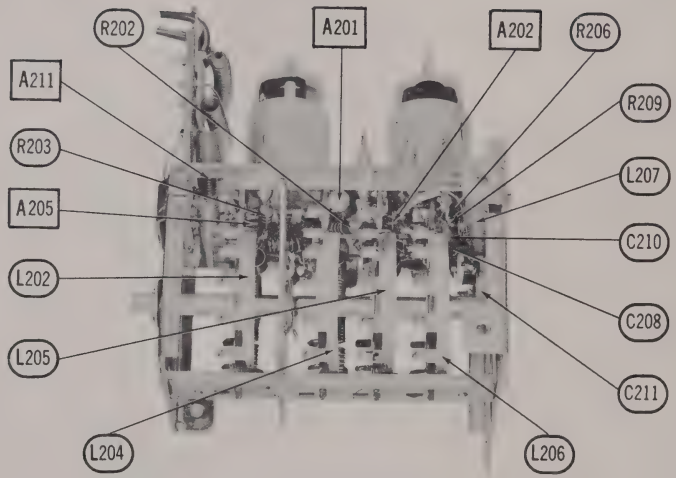
When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color — DESCRIPTION	PART NO.	MODEL NO. A19T2-3	A19T2-4	A19T2-5	Y19K11W, 19K11W	Y19K11WA, 19K11WA	Y19K12M, 19K12M	Y19K12MA, 19K12MA	Y19K12W, 19K12W	Y19K12WA, 19K12WA	Y19K13CW, 19K13CW	Y19K13CWA, 19K13CWA	Y19K14M, 19K14M	Y19K14MA, 19K14MA	Y19K14W, 19K14W	Y19K14WA, 19K14WA	Y19K15CW, 19K15CW	Y19K15CWA, 19K15CWA	Y19P3-1, 19P3-1	Y19P3-2, 19P3-2	Y19T1-3, 19T1-3	Y19T1-4, 19T1-4	Y19T1-5, 19T1-5
Pushbutton-Remote Transmitter	38B65058A01	X	X	X																			
Cabinet-Remote Transmitter	15D65070A01	X	X	X																			
Cabinet-Back Remote Transmitter	15D65069A01	X	X	X																			
Window-UHF Channel Indicator	64B65529A03												X	X	X	X	X	X			X	X	X
Window-UHF Channel Indicator	64A65529A03				X	X	X	X	X	X	X	X											
Mask-Picture Tube	13E6542A04	X	X	X																			
Mask-Picture Tube	13E6542A08				X	X	X	X	X	X	X	X	X	X	X	X	X	X					
Mask-Picture Tube	13E6542A10																		X	X			
Mask-Picture Tube	13E6542A03																				X	X	X
Dial-Channel Indicator	34D65581A01	X	X	X																			
Insert-UHF Dial Scale	34C65570A01				X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X
Insert-UHF Dial Scale	34D65657A01																		X	X			
Insert-VHF Dial Scale	34B65558A01				X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X
Bar-VHF Channel Selector	38D65515A01	X	X	X																			
Knob-VHF Channel Stop Selector (Rear)	36B65530A05	X	X	X																			
Knob-VHF Channel Selector	36D65545A03				X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X
Knob-VHF Channel Selector	36D65659A02																		X				
Knob-VHF Channel Selector	36D65659A01																			X			
Knob-UHF Channel Selector	36C65568A02				X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X
Knob-UHF Channel Selector	36D65655A02																		X				
Knob-UHF Channel Selector	36C65655A01																			X			
Knob-Fine Tuning	36B65524A01	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X
Knob-Fine Tuning	36B65524A02																		X				
Knob-Brightness, On-Off	36C65566A02	X	X	X																			
Knob-Contrast, Vertical	36C65565A01	X	X	X																			
Knob-Brightness, Contrast	36C65565A01				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Knob-Volume, Vertical	36C65566A02				X	X	X	X	X	X	X	X	X	X	X	X	X	X					
Knob-Volume, Vertical	36C65566A01																				X	X	X
Knob-Volume, Vertical	36C65658A02																		X				
Knob-Volume, Vertical	36C65658A01																			X			
Handle-Carrying	55C65631A01																		X				
Handle-Carrying	55C65631A02																			X			
Base-Cabinet	16E65639A04						X																
Base-Cabinet	16E65773A03							X															
Base-Cabinet	16E65639A03								X														
Base-Cabinet	16E65773A03									X													
Base-Cabinet	16E65640A03										X												
Base-Cabinet	16E65774A03											X											
Leg-Cabinet	16E65642A04												X										
Leg-Cabinet	16E65778A04													X									
Leg-Cabinet	16E65642A03														X								
Leg-Cabinet	16E65778A03															X							
Leg-Cabinet	16E65643A03																X						
Leg-Cabinet	16E65779A03																	X					

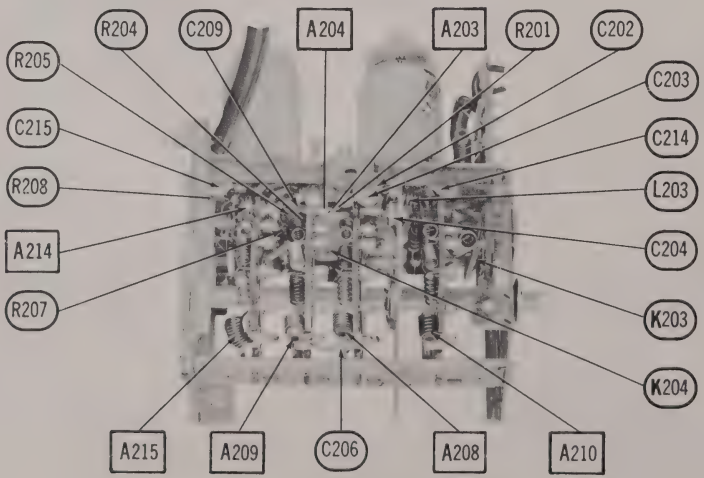
CABINET Part No.	MODEL
16E65635A01	Y19K11W, 19K11W
16E65765A01	Y19K11WA, 19K11WA
16E65639A02	Y19K12M, 19K12M
16E65773A02	Y19K12MA, 19K12MA
16E65639A01	Y19K12W, 19K12W

CABINET Part No.	MODEL
16E65773A01	Y19K12WA, 19K12WA
16E65640A01	Y19K13CW, 19K13CW
16E65774A01	Y19K13CWA, 19K13CWA
16E65642A02	Y19K14M, 19K14M
16E65778A02	Y19K14MA, 19K14MA

CABINET Part No.	MODEL
16E65642A01	Y19K14W, 19K14W
16E65778A01	Y19K14WA, 19K14WA
16E65643A01	Y19K15CW, 19K15CW
16E65779A01	Y19K15CWA, 19K15CWA







VHF TUNER 2ATT-133

TUNER ALIGNMENT INSTRUCTIONS (cont)

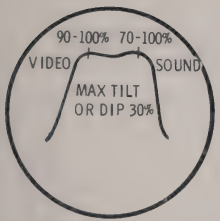


FIG. 201

FIG. 202

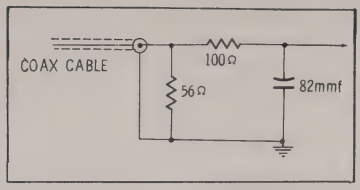
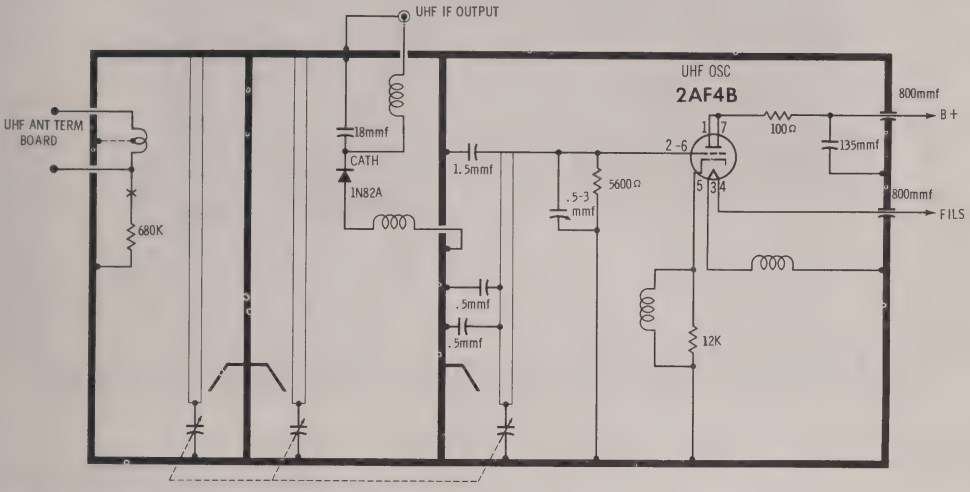


FIG. 203

FIG. 204



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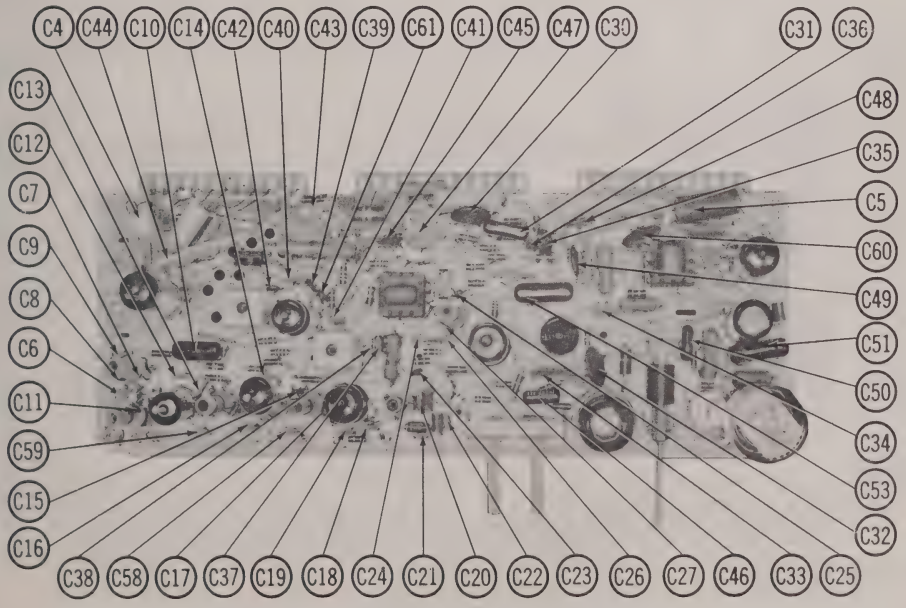
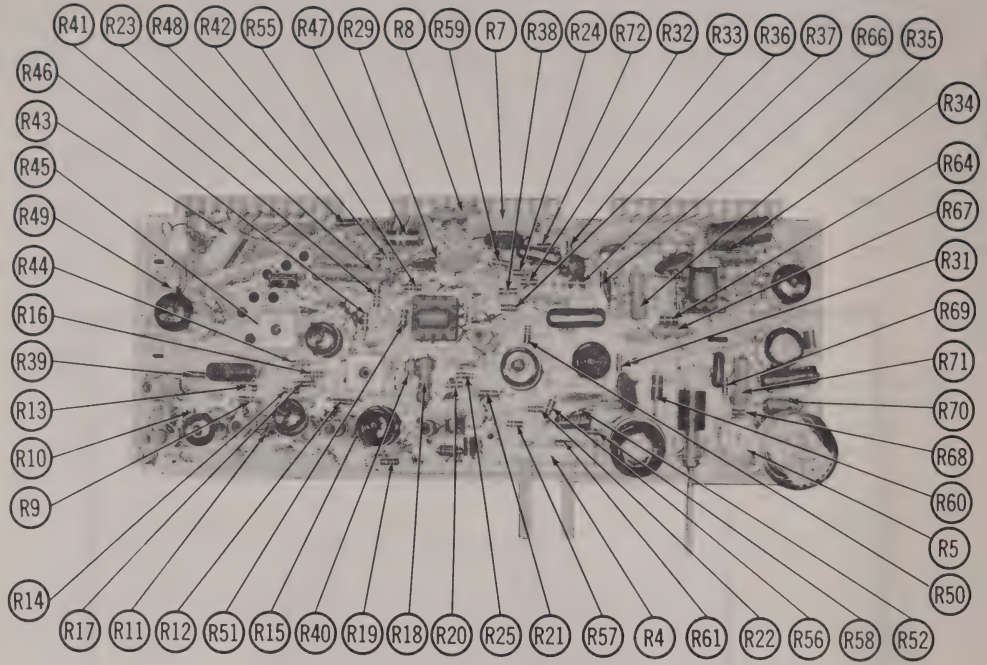
UHF TUNER VTT-600



PRINTED BOARD-CAPACITOR IDENT.



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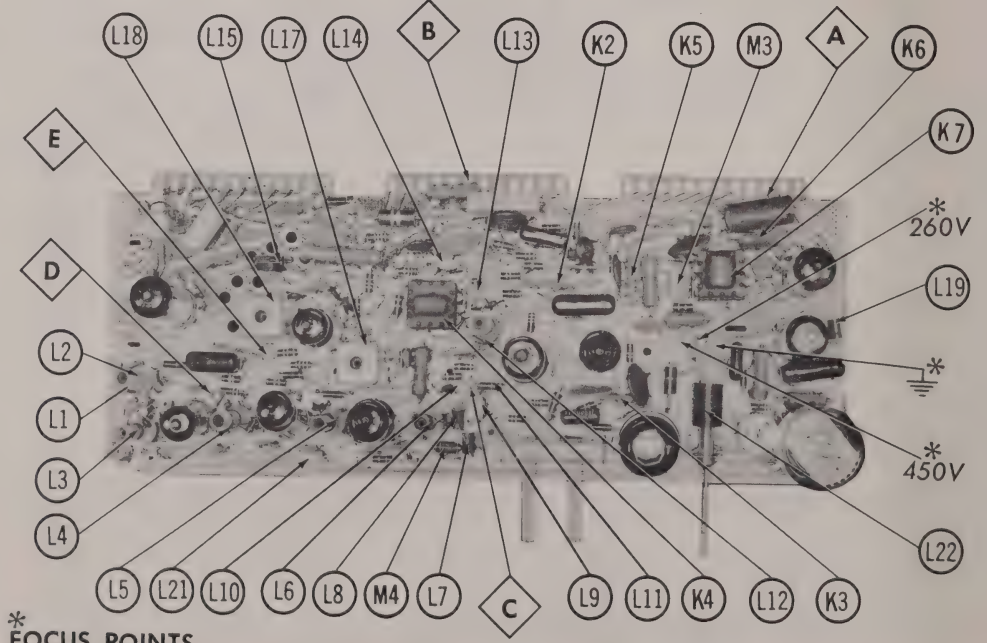


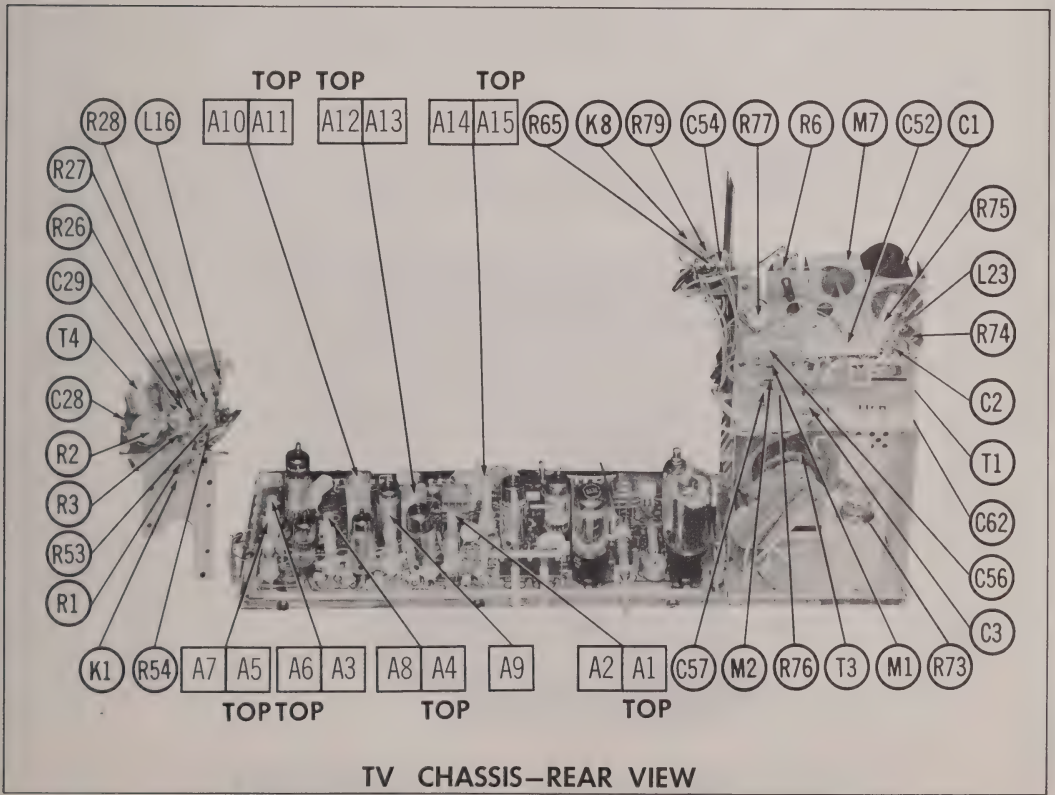
*FOCUS POINTS

PRINTED BOARD - ALIGN., MISC., INDUCTOR, FOCUS IDENT.

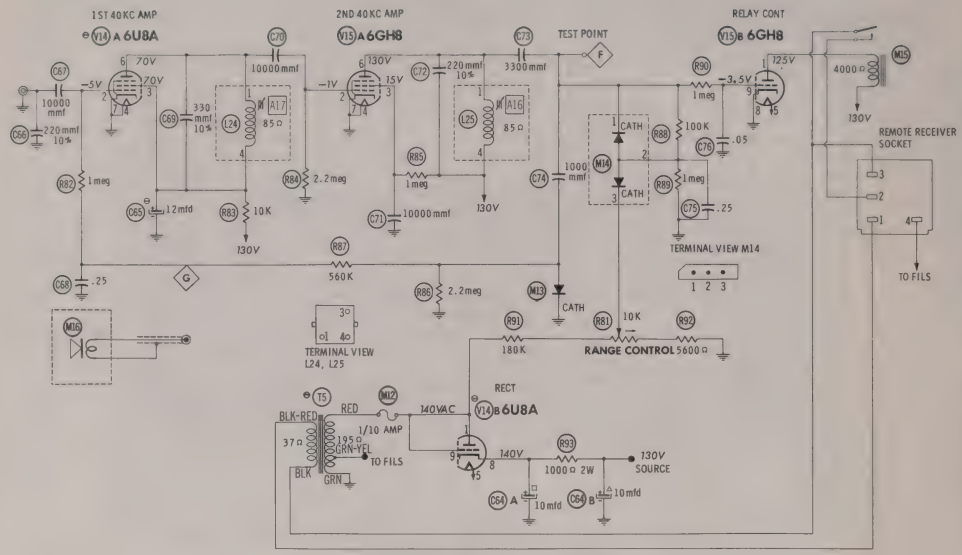
TV RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BZ6	700K	47Ω	10Ω	11Ω	▲470Ω	▲470Ω	0Ω		
V2	3BZ6	60K	INF	11Ω	12Ω	†1000Ω	†1000Ω	60K		
V3	6AU8	¶Ω	100K	†50K	14Ω	12Ω	56Ω	1000Ω	†6000Ω	†6000Ω
V4	8GN8	0Ω	● 2meg	● †5meg	7Ω	8Ω	47Ω	3900Ω	†22K	†7000Ω
V5	3BU8	†2700Ω	†30Ω	3.5meg	6Ω	7Ω	†40K	●†1meg	†68K	†10meg
V6	3DT6	3.5Ω	560Ω	3Ω	2Ω	†390K	†22K	560K		
V7	XL84/ 8BQ5	● 20Ω	NC	180Ω	10Ω	8Ω	NC	†830Ω	NC	†500Ω
V8	7EY6	NC	15Ω	†430Ω	†180Ω	● 2.8meg	NC	14Ω	0Ω	
V9	5EA8/ 5GN8	†11K	†3meg	†11K	6Ω	5Ω	†47K	0Ω	820Ω	1.8meg
V10	12DQ6B	NC	17Ω	NC	● †8000Ω	1meg	NC	15Ω	0Ω	TOP CAP †18Ω
V11	12AF3	NC	NC	NC	20Ω	17Ω	NC	NC	NC	†30Ω TOP CAP 6.5meg
V12	3A3	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †545Ω
V13	19AFP4	5Ω	100K	†1meg	0Ω	NC	NC	●230K	3Ω	
V201	XCC189/ 4ES8	†6000Ω	†1meg	INF	0Ω	1Ω	■0Ω	4meg	¶Ω	¶Ω
V202	5EU8	†8200Ω	15K	†10K	1Ω	2Ω	0Ω	100K	0Ω	†55K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM OUTPUT OF M1.
‡ MEASURED FROM CAP OF V11.
■ MEASURED FROM PIN 3 OF V201.
▲ MEASURED FROM PIN 2 OF V2.
NC NO CONNECTION



TV CHASSIS—REAR VIEW



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RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V14	6U8A	195Ω	3.9meg	††11K	0Ω	.1Ω	††11K	0Ω	¶	195Ω
V15	6GH8	††5000Ω	2.2meg	††1meg	0Ω	.1Ω	††1000Ω	0Ω	0Ω	2meg

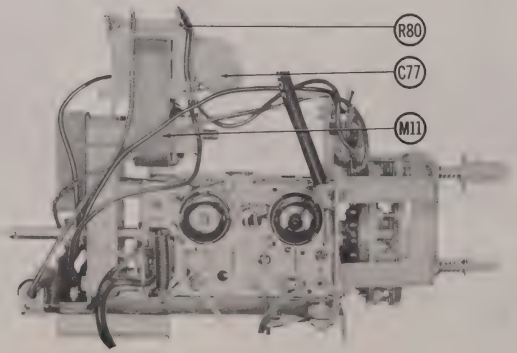
†† MEASURED FROM PIN 8 OF V14.
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.

REMOTE CONTROL RECEIVER ALIGNMENT

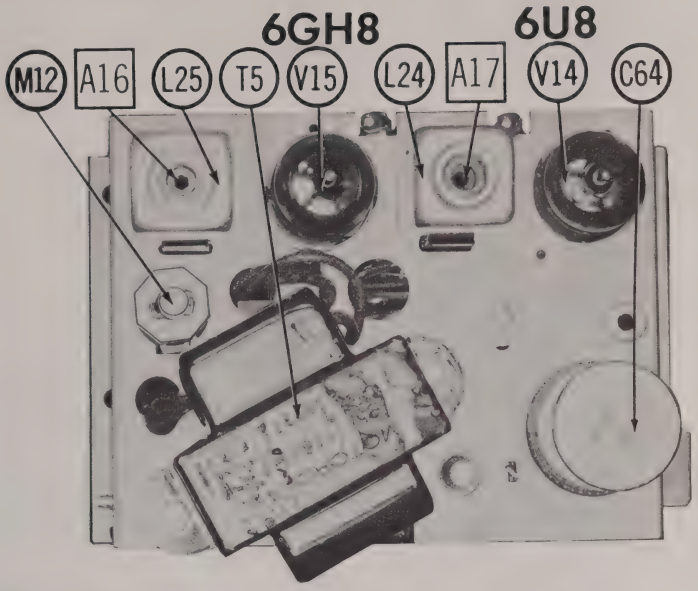
Connect the DC probe of VTVM to point (F) and common to chassis. With no signal applied, adjust the Remote Range Control for a reading of -12 volts on VTVM. Connect a clip lead from point (G) to chassis.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Across microphone input.	40KC		DC probe to point (F). Common to chassis.	A16, A17	Adjust for MINIMUM negative voltage. Increase generator output to produce approximately -4 volts on VTVM and readjust A16 and A17 for MINIMUM negative voltage.
2.	Replace Remote Receiver in cabinet. Turn Remote Range Control fully counterclockwise, then slowly clockwise until transmitter will operate receiver within required operating range. Keep control at lowest possible sensitivity.					

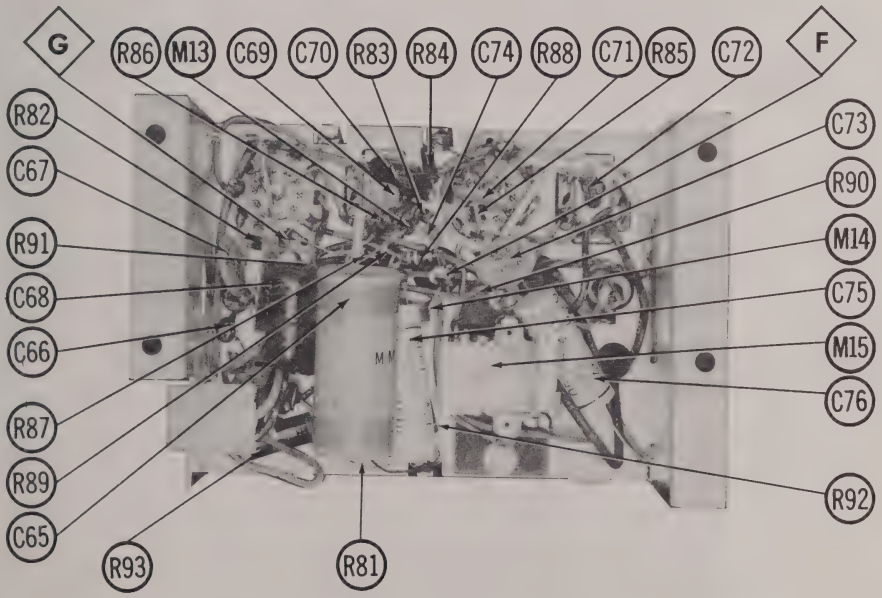
REMOTE CONTROL RECEIVER



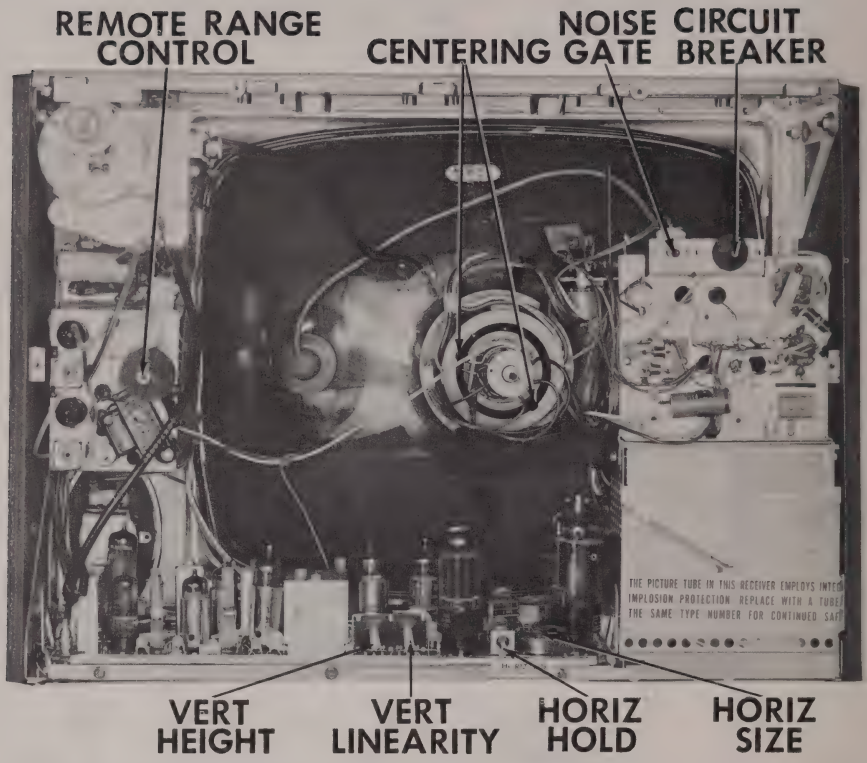
VHF TUNER—POWER TUNING ASSEMBLY



REMOTE CONTROL RECEIVER - TOP VIEW



REMOTE CONTROL RECEIVER - BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Set the Brightness and Contrast Controls for a normal picture.

Turn the Horizontal Hold clockwise until the picture loses sync. It may be necessary to switch off channel and back again for picture to lose sync.

Turn the Horizontal Hold slowly counterclockwise until the picture just falls into sync.

Adjust Horizontal Size for a picture slightly wider than necessary to fill the picture mask horizontally.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL MODEL A19T2-3

NOTE: For access to Printed Board for servicing, remove rear cover and bottom panel plate.

1. Remove 7 screws holding rear cover.
2. Remove 4 push-on type knobs.
3. Remove bottom panel plate.
4. Remove 4 screws (at bottom) and 1 (at side) holding chassis to cabinet.
5. Disconnect high voltage lead, yoke, picture tube socket, and speaker leads.
6. Remove 1 screw holding tuner assembly.
7. Remove 3 screws holding remote control receiver.
8. Remove 3 screws holding control panel.
9. Remove TV chassis, control panel, tuner assembly, and remote control receiver.

PICTURE TUBE REMOVAL

It is necessary to remove the TV chassis for picture tube removal.

PHOTOFACT® Folder

TRAV-LER MODELS 21K6067, 21MT6045 (Ch. 1150-90)

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

TRAV-LER MODELS 21K6067, 21MT6045 (Ch. 1150-90)

MODEL 21MT6045 (CH. 1150-90)

TRAV-LER MODELS 21K6067, 21MT6045 (Ch. 1150-90)

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TRAV-LER MODELS 21K6067, 21MT6045 (Ch. 1150-90)

CAUTION

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

MODEL 21MT6045 (CH. 1150-90)

TRADE NAME	TRAV-LER Models 21K6067, 21MT6045 (Ch. 1150-90)
MANUFACTURER	Trav-Ler Radio and Television Corp., 571 West Jackson Blvd., Chicago, Illinois
TYPE SET	Television Receiver
TUBES	VHF - Fifteen
POWER SUPPLY	110 - 120 Volts AC, 60 Cycle RATING 130 Watts, 1.25 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

It is necessary to remove the chassis and picture tube for safety glass cleaning or removal. (See "Disassembly Instructions", page 16.)

FUSE DEVICE

A 5.6Ω fusible resistor is used for low voltage power supply protection. (For location, see "Tube Placement Chart".)

TUNER OSCILLATOR ADJUSTMENT

To touch up the VHF Oscillator, it is necessary to remove the rear cover. The adjustments are accessible thru a hole in the right side of the tuner rear cover as viewed from the rear of the tuner.

AGC

The AGC may be varied by means of an AGC Control. (For location, see "Tube Placement Chart".)

FOCUS

The focus may be varied by the position of a strap on the base of the picture tube.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

The Horizontal Frequency Slug is used for the Horizontal Hold. (For location, see "Tube Placement Chart".)

WIDTH

The width may be varied by adjusting a metallic sleeve, located between the yoke and the picture tube neck, in or out of the yoke.

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

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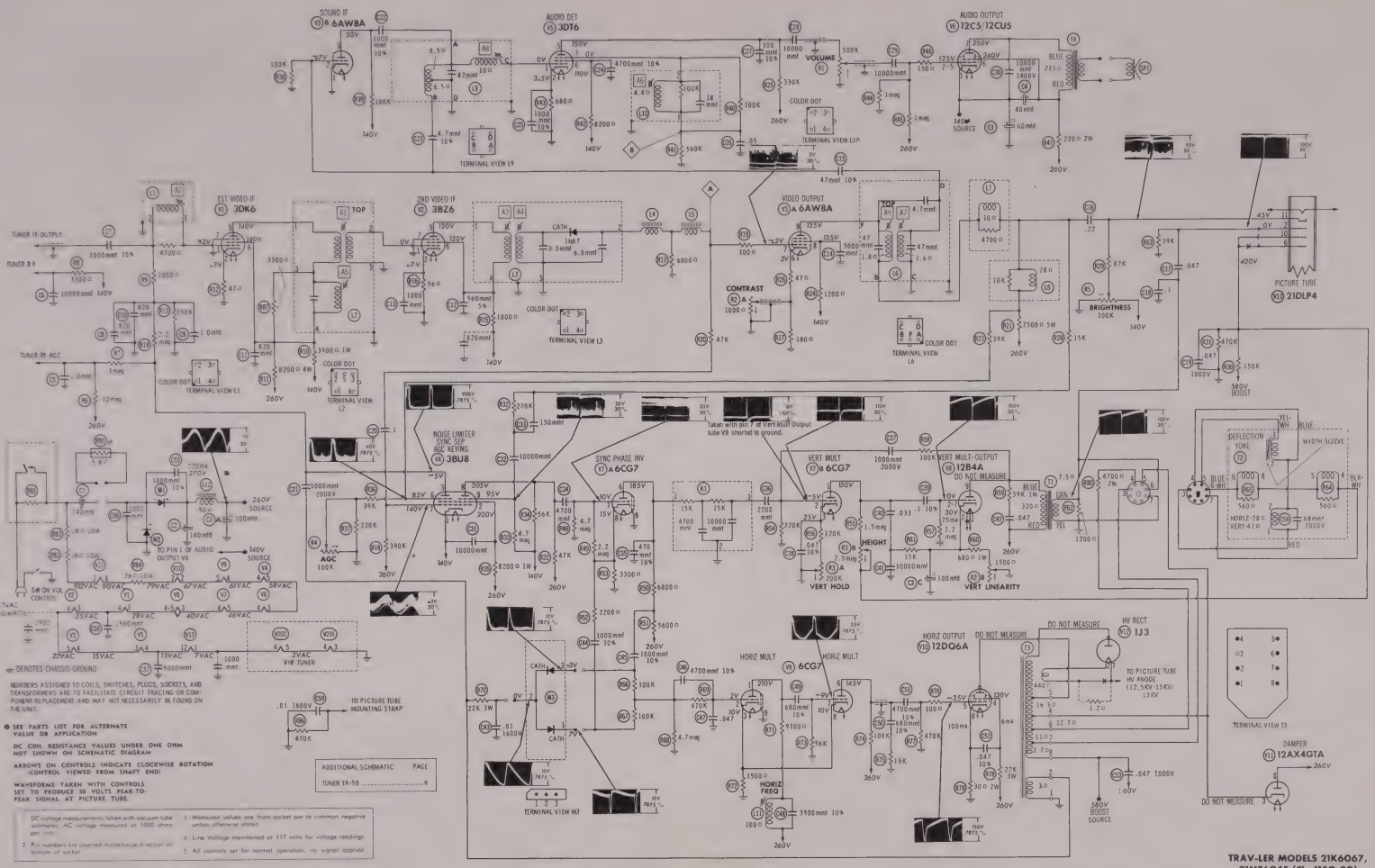
KA675

DATE 6-61 SET 533 FOLDER 2

SET 533 FOLDER 2



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.

DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured on 1000 ohms per volt.

2. Pin numbers are counted in clockwise direction on bottom of socket.

3. Measured values are from socket pin to common negative unless otherwise stated.

4. Line Voltage maintained at 117 volts for voltage readings.

5. All controls set for normal operation, no signal applied.

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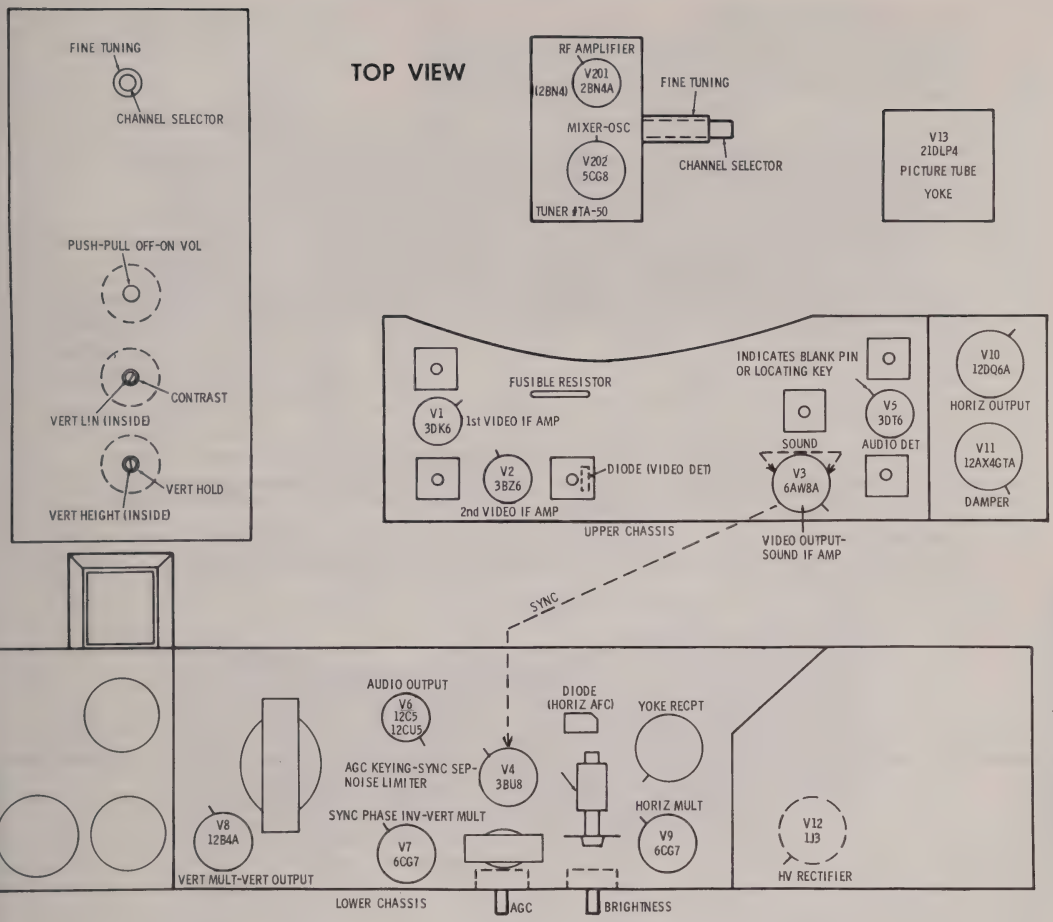
TRAV-LER MODELS 21K6067, 21MT6045 (Ch. 1150-90)

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

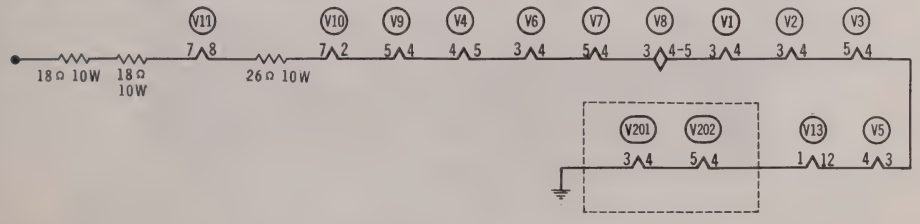
POWER SUPPLY FAILURE
No raster, no sound Fusible Resistor, Rectifiers (B+)

SWEEP FAILURE
No raster, has sound V9, V10, V11, V12, V13
No vertical deflection V7, V8
Poor vert. linearity or foldover V7, V8
Poor horiz. linearity or foldover V9, V10, V11
Narrow picture V9, V10, V11, Rectifier (B+)
Vert. off freq. V7, V8
Horiz. off freq. Diode (Horiz. AFC), V9

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, Diode (Video Det.), V3, V6
No pic, no sound, has snow V201, V202
No pic, has sound, has raster V3, V13
Has pic, no sound V3, V5, V6
Overloaded picture V4

SYNC FAILURE
No vert. sync V4, V7
No horiz. sync V4, V7
No vert. or horiz. sync V4, V7

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)



SET 533 FOLDER 2

TRAV-LER MODELS 21K6067, 21MT6045 (Ch. 1150-90)

FOLDER 2

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Set Contrast fully counterclockwise.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Place a thin insulated metal strip between the Mixer-Osc. tube and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	44.0MC (10MC Swp.)	41.25MC 42.25MC 45.75MC	Any non-interfering channel	Vert. Amp. thru 10K to point (A). Low side to chassis. (Across Video Det. load.)	A1, A2, A3, A4, A5 & Mixer Plate Coil	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. A1 controls low frequency side of curve, A2 controls high frequency side, A3 is adjusted for proper tilt, A4 for MINIMUM dip, A5 to place 41.25MC marker in trap notch and Mixer Plate Coil is adjusted for maximum gain.

SOUND IF ALIGNMENT

Tune in a strong TV signal and adjust A6 for maximum undistorted sound. If two peaks occur, connect the DC probe of a VTVM to point (B). Common to chassis. Adjust to the peak that produces the highest deflection on the VTVM.
Reduce the signal strength (by disconnecting the antenna or connecting an attenuator in series with the antenna) until a hiss is heard in the sound. Adjust A7 and A8 for maximum undistorted sound. Reduce the signal strength even farther and retouch A7 and A8 for maximum undistorted sound. If necessary, repeat the above procedure.

4.5MC TRAP ALIGNMENT

Tune in a strong TV signal and set Contrast at maximum. Adjust the Fine Tuning until a beat pattern is visible. Adjust A9 for MINIMUM beat interference.

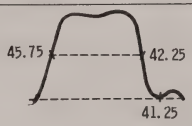
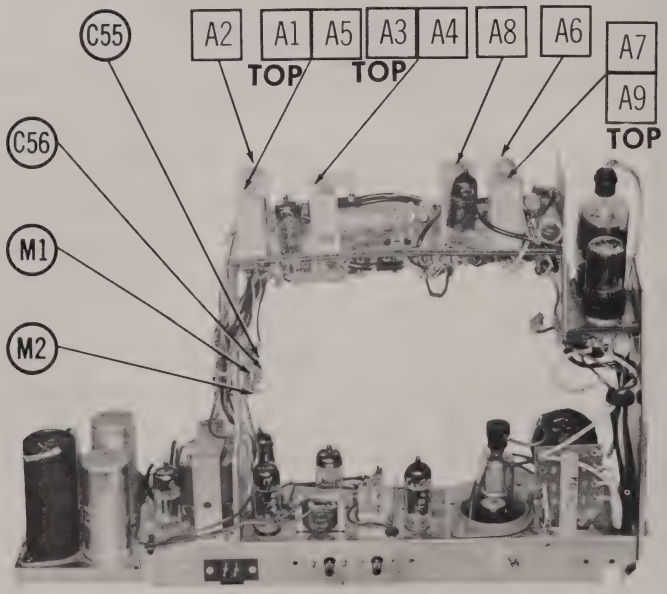
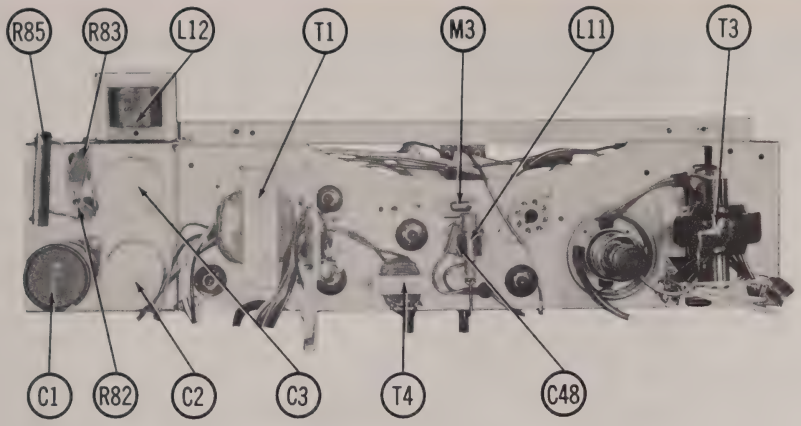


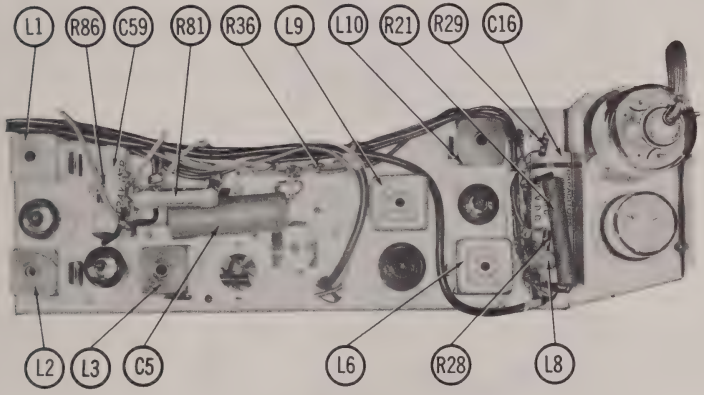
FIG. 1



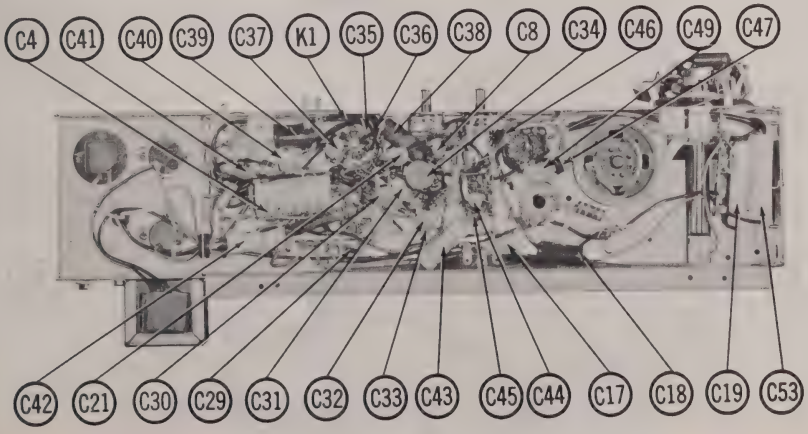
CHASSIS - REAR VIEW



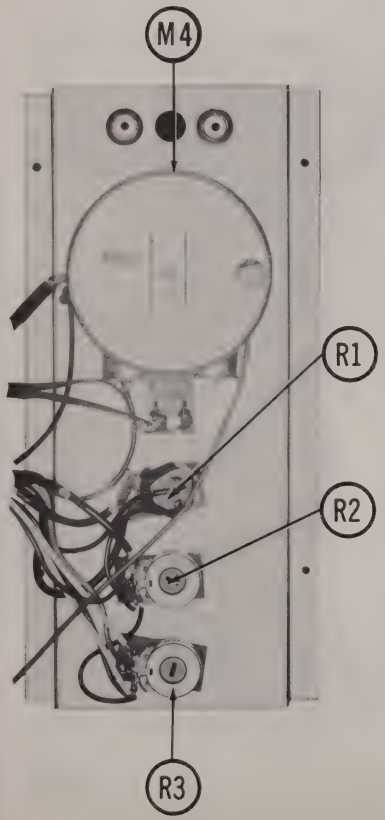
LOWER CHASSIS - TOP VIEW



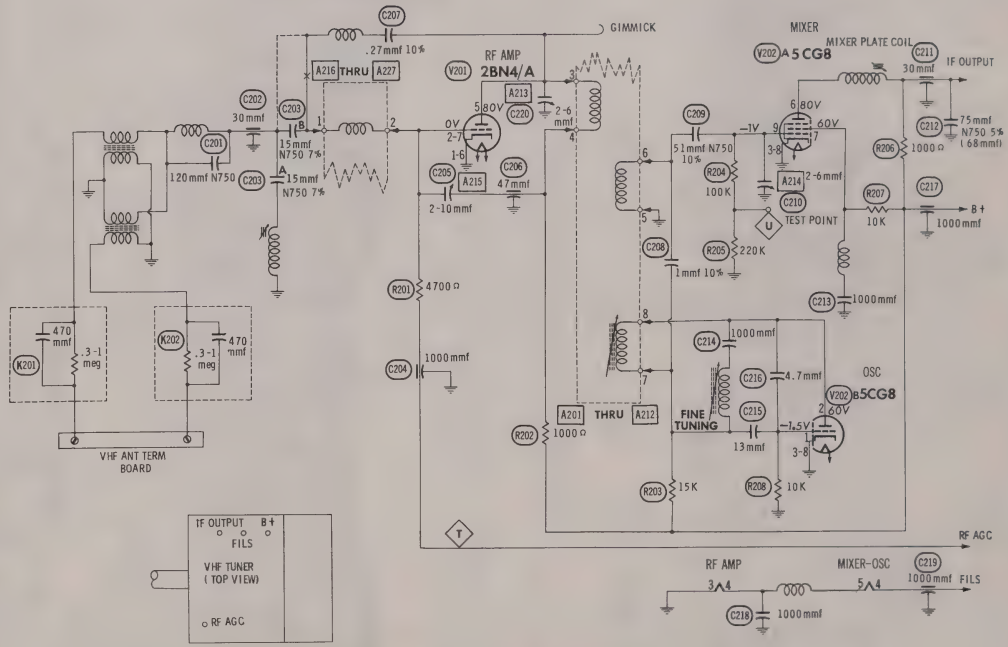
UPPER CHASSIS - TOP VIEW



LOWER CHASSIS - BOTTOM VIEW



CONTROL PANEL



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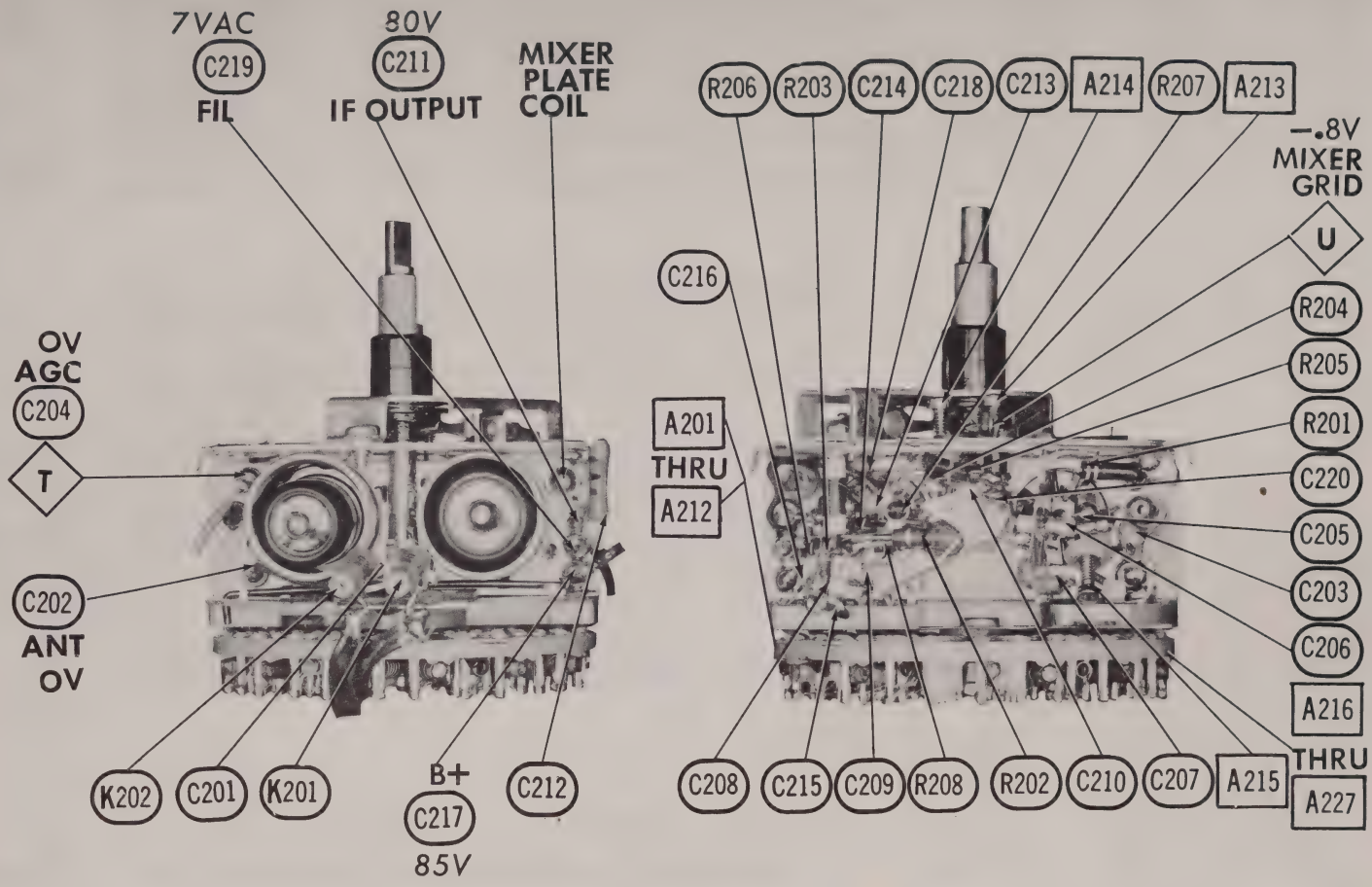
TUNER TA-50


7VAC
C219
FIL
80V
C211
IF OUTPUT
MIXER
PLATE
COIL
R206
R203
C214
C218
C213
A214
R207
A213
−.8V
MIXER
GRID
U
C216
R204
R205
R201
C220
C205
C203
C206
A216
THRU
A227
OV
AGC
C204
T
A201
THRU
A212
C202
ANT
OV
K202
C201
K201
B+
C217
85V
C212
C208
C215
C209
R208
R202
C210
C207
A215

TUNER TA-50

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	GENERAL ELECTRIC • RAYTHEON • SYLVANIA • USE	TYPE
V1	1st Video IF Amp.	3DK3
V2	2nd Video IF Amp.	3BZ6
V3	Video Output - Sound IF Amp.	6AW8A
V4	AGC Keying - Sync Sep. - Noise Limiter	3BU8
V5	Audio Detector	3DT6
V6	Audio Output	12C5/12CU5
V7	Sync Phase Inv. - Vert. Mult.	6CG7
V8	Vert. Mult. - Vert. Output	12B4A
V9	Horiz. Mult.	6CQ7
V10	Horiz. Output	12DQ6A
V11	Damper	12AX4GTA
V12	HV Rectifier	1J3

PICTURE TUBE

ITEM No.	REPLACEMENT DATA: TRAV-LER PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
V13	21DLP4	21DLP4 ①	21DLP4 ①		21DLP4 ②	① Aluminized ② Silver Screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP	VOLT	REPLACEMENT DATA: TRAV-LER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	140	300	EC-64	AFHS1-37-25	XA3266	FPI40-5	TMS-1480	TVL-1540	
C2	140	300	EC-119	AFHS1-37-25	XA0355	FPI40-5	TMS-1570	TVL-1584	
C3A	100	300	EC-120	AFHS4-100-25	D0044-, BR9008*	FP330-28	TMT-3280	TVL-4711	
B	80	300							
C	100	50							
C4	40	300	EC-113	PRS2580	BR4035	TC56	TD-40-350	TVA-1511	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	1.0mfd 100V		P288N-1.0		CUB3W1	1DP-5-106	GEM-21	3TM-M1
C6			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5SK-S10
C7	1000 10%		DE-1000	DD-102	5RS1N	CCD-102	GP310	10TS-D10
C8			DI-820	DD-821	BYA10T82	CCD-821	B-382	10TS-T82
C9	1.0mfd 100V		P288N-1.0		CUB3W1	1DP-5-105	GEM-21	3TM-M1
C10	820		DI-820	DD-821	BYA10T82	CCD-821	B-382	10TS-T82
C11	820		DI-820	DD-821	BYA10T82	CCD-821	B-382	10TS-T82
C12	560	5%			5RS756	CM-19B-561J	MCJ-347	MB-356
C13	1000		BPD-001	DD-103	BYA10D1	CCD-102	B-210	5SK-D10
C14	1000		BPD-005	DD-503	BYA10D6	CCD-502	B-250	5SK-D50
C15	47	10%	NPO-47 47	TCZ-47	C10Q47C	CCTO-470	CNO-447	10TCC-Q47
C16	22	400V	P488N-22		CUB4P22	4DP-5-224	GEM-4022	4TM-P22
C17	.047	600V	P488N-047	DD-503	CUB6S47	6DP-5-473	GEM-6147	6TM-S47
C18	1	600V	P688N-1	DF-104	CUB6P1	6DP-4-104	GEM-601	6TM-P10
C19	.047	1000V	P10S3N-047		CUB10S47	10DP-5-473	GEM-10147	10TM-S47
C20	.1	600V	P688N-1	DF-104	6P6P1	6DP-4-104	GEM-601	6TM-P10
C21	1000	2000V	HVD-30-1000	DD30-102	HVB30D1	3CCD-102	3HV-B10	BL-D10
C22	1000	10%	DI-1000	DD-102	5RS1N	CCD-102	GP310	10TS-D10
C23	4.7	10%	NPO-4R 4.7	TCZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C24	4700	10%	DI-4700		P10S147	CCD-472	JL-247	10TS-D47
C25	1000	10%	BPD-001	DD-102	P10S1N	CCD-102	GP310	10TS-D10
C26	05	400V	P488N-05	DD-503	CUB4S5	4DP-5-503	GEM-415	4TM-S50
C27	100	10%	DI-100	DD-101	5JD71	CCD-101	GP310	10TS-T10
C28	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5SK-S10
C29	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5SK-S10
C30	10000	1400V	DAC-37	DD36-103	HVT36S1	16DP-3-103	UAC-110	BL-S10
C31	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5SK-S10
C32	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5SK-S10
C33	150		DE-150	DD-150	5JP7S	CCD-151	B-315	10TS-T15
C34	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-347	5SK-D47
C35	470	10%	DI-470	DD-471	5RS747	CCD-471	GP347	10TS-T47
C36	2200		BPD-0022	DD-222	BYA10D22	CCD-222	B-322	5SK-D22
C37	1000	2000V	HVD-30-1000	DD30-102	HVB30D1	3CCD-102	3HV-B10	BL-D10
C38	047	600V 10%	P688N47-10%		CUB6S47	6DP-3-473	GEM-1615	6TM-S47
C39	1	600V 10%	V96C68P1-10%		P6S1P1	6DP-4-104	GEM-1601	6TM-P10
C40	.033	600V	P688N-033	DD-303	CUB6S33	6DP-3-333	GEM-6133	6TM-S33
C41	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5SK-S10
C42	.047	600V	P688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47
C43	.01	1600V	P1684CM-01	DD6-103	HV316S1	16DP-3-103	GEM-1611	MB-S1
C44	1000	10%	DI-1000	DD-102	5RS1N	CCD-103	GP310	10TS-D10
C45	1000	10%	DI-1000	DD-102	5RS1N	CCD-102	GP310	10TS-D10
C46	4700	10%	DU-4700		P10S147	CCD-473	JL-247	10TS-D47
C47	.047	600V	P688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47
C48	3900	10%	1484-0039		1RSD39	CM-20B-392K	MCJ462.5	MB-339
C49	560	10%	1469-00068		5RS756	CM-19B-561K	MCJ349	MB-356
C50	560	10%	1469-00068		5RS756	CM-19B-561K	MCJ349	MB-356
C51	4700	10%	DI-4700		P10S147	CCD-472	JL-247	10TS-D47
C52	.047	600V 10%	V96C68P47-10%		P6S47	6DP-3-473	GEM-1615	6TM-S47
C53	.047	1000V	P10S8N-047		CUB10S47	10DP-5-473	GEM-10147	10TM-S47
C54	68	2000V 10%			HVA20Q68	VCM-20-680K	2DY-468	
C55	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5SK-D10
C56	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5SK-D10
C57	5000		BPD-005	DD-502	BYA10D6	CCD-502	B-250	5SK-D50
C58	1500		BPD-0015	DD-152	BYA10D15	CCD-152	B-215	5SK-D15
C59	.01	1600V	P1684CM-01	DD6-103	CUB6S1	16DP-3-103	GEM-1611	MB-S1

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: TRAV-LER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K		VC-120	B2L-60	C47S-500K-Z	B13-153 *	FP55A	Volume
B	Shaft			Not Req.	KSB-3	Not Req.	Not Req.	
C	Switch			Not Req.	Not Req.	SKT *	Not Req.	Push-Pull Off-On Contrast
R3A	1000Ω		VC-195A	F1-5	RTV-734	‡ GJ-1518	▲ UE4191	Vert. Linearity
B	1500Ω			R2-6				

CONTROLS (cont)

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: TRAV-LER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R3A	200K		VC-194A	F1-33	RTV-733	‡ GJ-1130	▲ UE4131	Vert. Hold
B	2.5meg			R2-76				Height
R4A	100K		VC-84	TT-40	B47-100K-S	B11-128	PTA15L	AGC
B	Shaft			Not Req.	Not Req.	TM4	Not Req.	
R5A	100K		VC-84	TT-40	B47-100K-S	B11-128	PTA15L	Brightness
B	Shaft			Not Req.	Not Req.	TM4	Not Req.	

* Factory assembled Part #PPQ13-133 (SK7).
† "CONCENTRIKIT" Equivalent: K-15 Kit with Base Elements and Shafts: B17-108, P17-028, (Panel) B11-109, K15-005, (Rear)
‡ "CONCENTRIKIT" Equivalent: K-15 Kit with Base Elements and Shafts: B11-128, P17-028, (Panel) (Not available as a factory assembled unit). B11-239, K15-005, (Rear)
■ "STA-LOC" Equivalent: FA13R, RU13L, C5875A, 1K525.
▲ "STA-LOC" Equivalent: FA35L, RU35L, C5875A, 1K525.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA: IRC PART No.	WORKMAN TV PART No.	REMARKS
R6	10meg			
R7	3meg			
R8	3300Ω			
R9	100Ω			
R10	3900Ω 1W			
R11	8200Ω 4W	PW4-8200	4G-8200	
R12	47Ω			
R13	150K			
R14	2.2meg			
R15	1800Ω			
R16	56Ω			
R17	8600Ω			
R18	390K			
R19	100Ω			
R20	47K			
R21	7500Ω 5W	PW5-7500	5W-8Q-7500	
R22	47K			
R23	39K			
R24	1200Ω			
R25	330K			
R26	47Ω			
R27	180Ω			
R28	15K			
R29	82K			
R30	150K			
R31	470K			
R32	270K			
R33	4.7meg			
R34	56K			
R35	8200Ω 1W			
R36	39K			
R37	220K			
R38	100K			
R39	8200Ω			
R40	100K			
R41	560K			
R42	8200Ω			
R43	680Ω			
R44	1meg			
R45	1meg			
R46	150Ω			

ITEM No.	RATING	REPLACEMENT DATA: IRC PART No.	WORKMAN TV PART No.	REMARKS
R47	220Ω 2W			
R48	4.7meg			
R49	2.2meg			
R50	680Ω			
R51	5600Ω			
R52	2200Ω			
R53	3300Ω			
R54	220K			
R55	1.5meg			
R56	120K			
R57	2.2meg			
R58	100K			
R59	39K 1W			
R60	680Ω 1W			
R61	15K			
R62	1200Ω			
R63	39K			
R64	560Ω			
R65	560Ω			
R66	100K			
R67	100K			
R68	4.7meg			
R69	470K			
R70	22K 3W	PW3-22K	3G-22K	
R71	910Ω			
R72	1500Ω			
R73	56K			
R74	100K			
R75	15K			
R76	100Ω			
R77	470K			
R78	22K 3W	PW3-22K	3G-22K	
R79	300 2W			
R80	4700Ω 2W			
R81	5.6Ω ①	FR 5.6	F 5.6	
R82	18Ω 10W	PW10-18	10W-8Q-18	
R83	18Ω 10W	PW10-18	10W-8Q-18	
R84	26Ω 10W	PW10-26	10W-8Q-26	
R85			SR1	#F-9
R86	470K			
R87	3300Ω			

① Fusible Type.

Trav-Ler Part Number.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	TRAV-LER PART No.	REPLACEMENT DATA
K1	Vert. Integrator	4700mmf, 10000mmf, 15K, 15K	CC-120	Centralab PC-392

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: TRAV-LER PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	NOTES
L1	1st Video IF	L-150	TV-126 *	6135 *	RTC-8558 *	T308 *	① Wound on 4700Ω Resistor. ② Wound on 10K Resistor. ③ Includes 100K Resistor and 18mmf Capacitor. *Disregard Secondary. †Parallel with 470Ω Resistor. ▲Parallel with 10K Resistor. ▲Parallel with 100K Resistor.
L2A	2nd Video IF	L-153	TV-127	6232	RTC-8559	T309	
B	41.25MC Trap						
L3	3rd Video IF	L-152				T276	
L4	RF Choke (10uh)	L-160	BC-586	4612	RTC-8522	T860	
L5	RF Choke (27uh)	L-158	TV-192	4615	RTC-8525	T863	
L6A	4.5MC Trap	L-154		1462 IFT	RTC-8056	T253	
B	1st Sound IF						
L7	Peaking (180uh)	L-163 ①	TV-184 †	6180 †	RTC-8597 †	T310 †	
L8	Peaking (950uh)	L-163 ②	TV-206 ▲	6157 ▲	RTC-8598 ▲	T329 ▲	
L9	2nd Sound IF	L-167					
L10	Quadrature	L-110A ③	TV-154 ▲	1461 ▲	RTC-8606 ▲	T248 ▲	

COILS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: TRAV-LER PART No.	Merit PART No.	Miller PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	Workman TV PART No.
L11	Horiz. Stabilizer (Freq.)	L-156	TV-163	6210	RC110	RTC-8622	HS-5	WLC-25	T103

FILTER CHOKE

ITEM No.	RATINGS: CURRENT (Measured)	DC RES.	INDUCTANCE @ CURRENT 1000 ~	REPLACEMENT DATA: TRAV-LER PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
L12	.220A	50Ω	1.1 Hy.	FC-5	C-2996	C-2343	26C44	C-34X	① Drill new mounting hole.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: TRAV-LER PART No.	Merit PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	Vert. Output	TR-26C	A-2823	VO34	VO-112	26S53	A-108X	
T2	Yoke (Horiz. 21MH) (90°) (Vert. 39MH) Rear Cover and Centering Device	L-118C †	MDF-92 ① ②	PCM-2045 ① ②	DY-16A ① ②	Y-16 ① ②	Y-41 & XW2 & YC12	
	Yoke Clamp							
T3	Horiz. Output	ST-35 TR-53A	HVO-54 *	EFR-172 *	A-8255 *	FLY-76 *	D-151R *	

① Requires new rear cover, centering device, and yoke clamping device.
② Connect horizontal yoke damping capacitor across yoke terminals #2 and #1.
† Includes rear cover and centering device.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Special Notes	ORIGINAL TERMINAL CONNECTIONS	Merit Replacement Connections	Rogers Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	5	5	5	5	5	5
	4	4	4	4	4	6
	6	NC See Note ②	NC See Note ③	NC See Note ③	NC See Note ③	3
	7	2	2	2	2	7
	8	1	1	1	1	8
	2	7	7	7	7	2
	1	8	8	8	8	1
		②④	③④	②④	②④	

② Remove R80, Capacitor C54, and yoke center tap lead from circuit. Requires new damping network, consisting of 150Ω, 1 watt Resistor and 82mmf ② 2KV Capacitor connected in series. Install damping network across horizontal yoke terminals #3 and #7.
④ Remove one turn from filament winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: TRAV-LER PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T4	2600Ω	3-4Ω	AT-52	A-3025	A-3333	24S53	S-12X	

SPEAKER

ITEM No.	TYPE: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: TRAV-LER PART No.	QUAM PART No.	NOTES
SP1	5"	PM	3-4Ω	SPK-36	5A07	

POWER RECTIFIERS

ITEM No.	RATING: CURRENT (Measured)	REPLACEMENT DATA: TRAV-LER PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.220A	SR-14	1N1763	40E	SR500	
M2	.220A	SR-14	1N1763	40E	SR500	

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: TRAV-LER PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
M3		SR-15 *	6GDX *		1-203 *	*Dual Selenium Diode, Series Connected.

MISCELLANEOUS

ITEM No.	PART NAME	TRAV-LER PART No.	NOTES
M4	Tuner	TA-50	VHF

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	MP-144	Plastic, Model 21K6067 & 21MT6045
Mask	MP-176	Model 21K6067
Mask	MP-175	Model 21MT6045

PARTS LIST AND DESCRIPTIONS (Continued)

CABINETS & CABINET PARTS (cont)

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Escutcheon	ES-27	Model 21MT6045
Knob	K-412	Channel Selector, Model 21K6067
Knob (Mahogany)	K-335A	Channel Selector, Model 21MT6045
Knob (Beige)	K-422	Channel Selector, Model 21MT6045
Knob	K-411	Fine Tuning, Model 21K6067
Knob	K-201	Fine Tuning, Model 21MT6045
Knob	K-409	Volume, Model 21K6067
Knob (Beige)	K-420	Volume, Model 21MT6045
Knob	K-410	Contrast, Vert. Hold, Model 21K6067
Knob (Beige)	K-421	Contrast, Vert. Hold, Model 21MT6045
Cabinet	CA-389	Model 21K6067
Cabinet	C-380-1	Model 21MT6045
Leg, Cabinet	CH-133	Model 21K6067
Base, Cabinet	C-380-2	Model 21MT6045

WIRING DATA

High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

TUNER PARTS LIST AND DESCRIPTIONS

TUBES

• GENERAL ELECTRIC •			• RAYTHEON • SYLVANIA •		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V201	RF Amp.	2BN4A (2BN4) *	V202	Mixer - Osc.	5CG8

* Alternate

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REMARKS	REPLACEMENT DATA					
					AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	120	N750								
C202	30									
C203A	15	N750	7%		N750-DI 15	DTN-15	C10Q15U	CCTN-150	CN7-415	10TCU-Q15
B	15	N750	7%		N750-DI 15	DTN-15	C10Q15U	CCTN-150	CN7-415	10TCU-Q15
C204	1000				EF-001	MFT-1000		CCF-102	CT280A	
C205	2-10					829-10				
C206	47									
C207	.27		10%							
C208	1		10%		NPO-SI 1.0	TCZ-1			CNO-515	10TCC-V10
C209	51	N750	10%			TCN-51	C10Q51U			
C210	2-6					829-6		CV-3	CT552	
C211	30									
C212	75	N750	5%	(68) †		TCN-75	C10Q75U		CN7-475	10TCU-Q75
C213	1000				DI-1000	DD-102	BYA10D1	CCD-102	GP210	10TS-D10
C214	1000				DI-1000	DD-102	BYA10D1	CCD-102	GP210	10TS-D10
C215	13					TCZ-12	C10Q13C	CCTO-120	CNO-412	10TCC-Q12
C216	4.7				NPO-DI 4.7	DTZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C217	1000				EF-001	MFT-1000		CCF-102	CT280A	
C218	1000				DI-1000	DD-102	BYA10D1	CCD-102	GP210	10TS-D10
C219	1000				EF-001	MFT-1000		CCF-102	CT280A	
C220	2-6					829-6			CV-3	

† Alternate Value

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R201	4700Ω				R205	220K			
R202	1000Ω				R206	1000Ω			
R203	15K				R207	10K			
R204	100K				R208	10K			

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	TRAV-LER PART No.	REPLACEMENT DATA
K201	Antenna Isolation	470mmf, .3-1meg		Centralab RC-471 Sprague AC1-1
K202	Antenna Isolation	470mmf, .3-1meg		Centralab RC-471 Sprague AC1-1

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: A201 thru A212 ..... GENERAL CEMENT #8282, 8606, 8606-L, 9091
WALSCO #2526, 2541, 2542, 2543, 2544
A213 thru A215 ..... GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528

VHF OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across Video Det. load.	A201	Adjust to place sound marker in trap notch as in Fig. 201. Video marker should fall at 50%.
		207MC	205.25MC 209.75MC	12		A202	
		201MC	199.25MC 203.75MC	11		A203	
		195MC	193.25MC 197.75MC	10		A204	
		189MC	187.25MC 191.75MC	9		A205	
		183MC	181.25MC 185.75MC	8		A206	
		177MC	175.25MC 179.75MC	7		A207	
		85MC	83.25MC 87.75MC	6		A208	
		79MC	77.25MC 81.75MC	5		A209	
		69MC	67.25MC 71.75MC	4		A210	
		63MC	61.25MC 65.75MC	3		A211	
		57MC	55.25MC 59.75MC	2		A212	

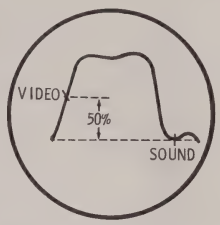


FIG.201

VHF RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
Connect the negative lead of a 4.5 volt bias supply to point Ⓣ. Positive to chassis.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Across antenna terminals with 120Ω in each lead.	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point Ⓤ. Low side to chassis.	A213 A214 A215	Adjust A213 and A214 for maximum amplitude and symmetry with markers as shown in Fig. 202. Increase bias for MINIMUM amplitude of response curve. Without changing the bias adjust A215 to obtain MINIMUM response on the scope.
3.	"	213MC	211.25MC 215.75MC	13	"	A216	Adjust for maximum amplitude of response similar to Fig. 202. Adjust by expanding or compressing coil turns.
		207MC	205.25MC 209.75MC	12		A217	
		201MC	199.25MC 203.75MC	11		A218	
		195MC	193.25MC 197.75MC	10		A219	
		189MC	187.25MC 191.75MC	9		A220	
		183MC	181.25MC 185.75MC	8		A221	
		177MC	175.25MC 179.75MC	7		A222	
		85MC	83.25MC 87.75MC	6		A223	
		79MC	77.25MC 81.75MC	5		A224	
		69MC	67.25MC 71.75MC	4		A225	
		63MC	61.25MC 65.75MC	3		A226	
		57MC	55.25MC 59.75MC	2		A227	

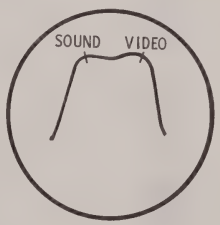
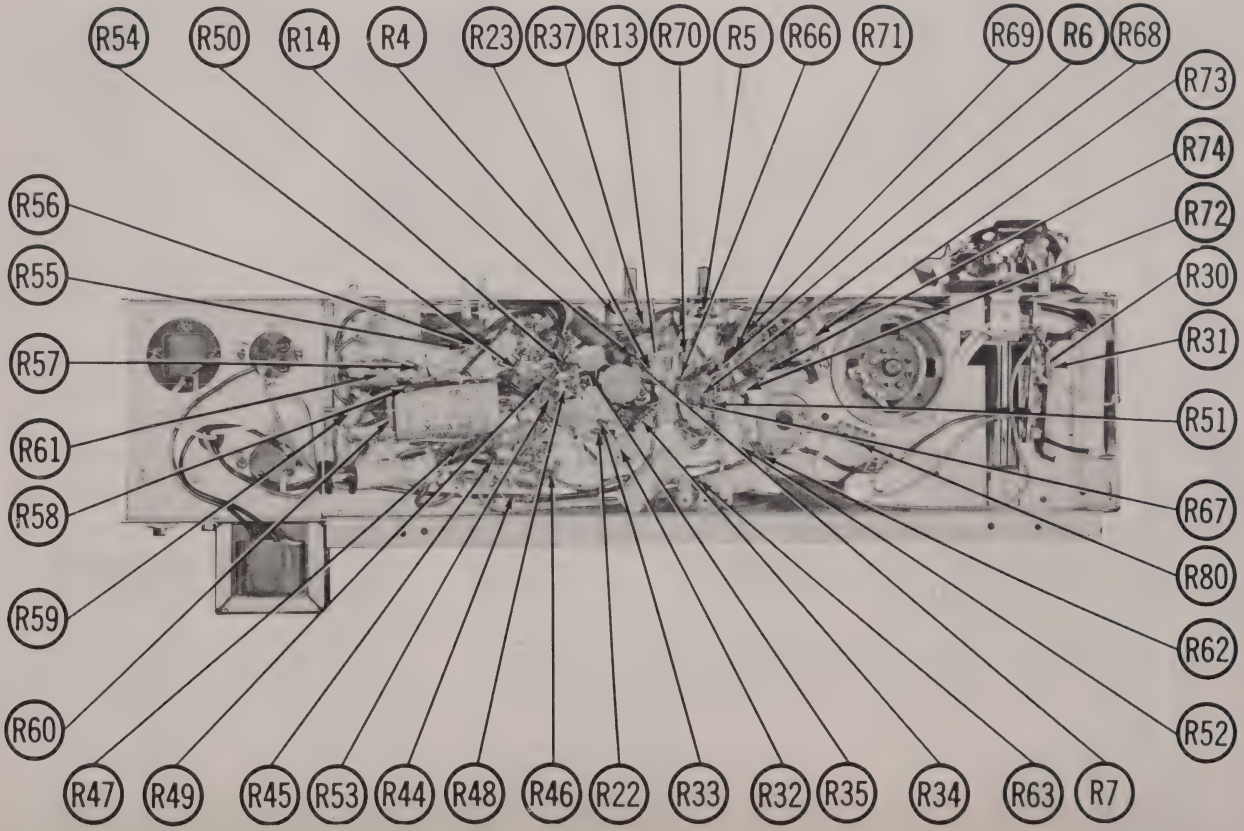
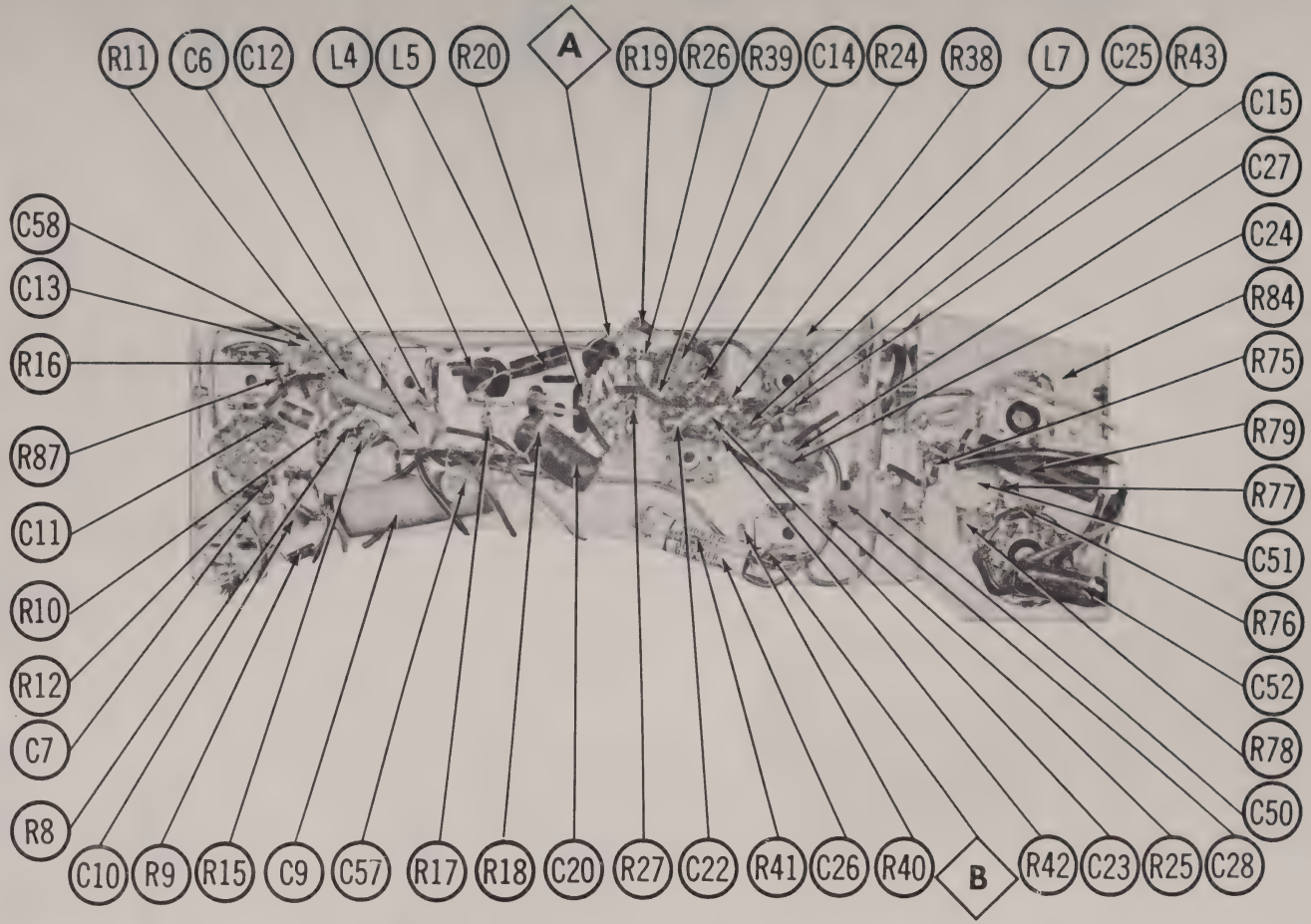


FIG.202



LOWER CHASSIS - BOTTOM VIEW



UPPER CHASSIS - BOTTOM VIEW

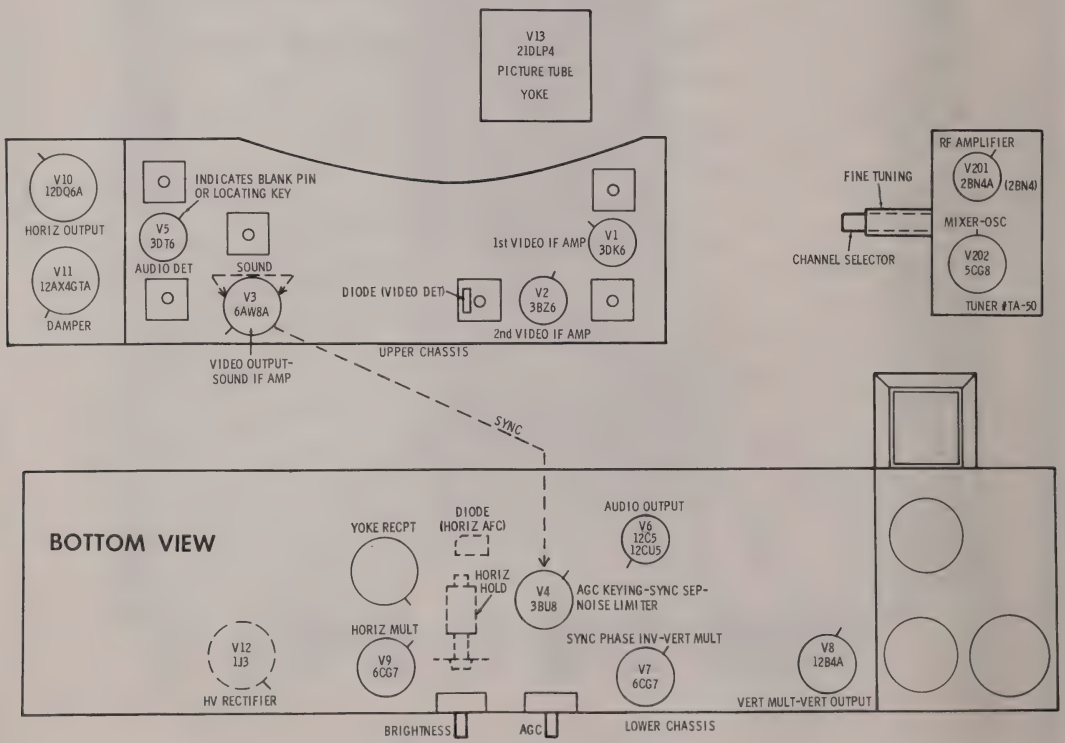
TRAV-LER MODELS 21K6067,
21MT6045 (Ch.1150-90)

FOLDER 2

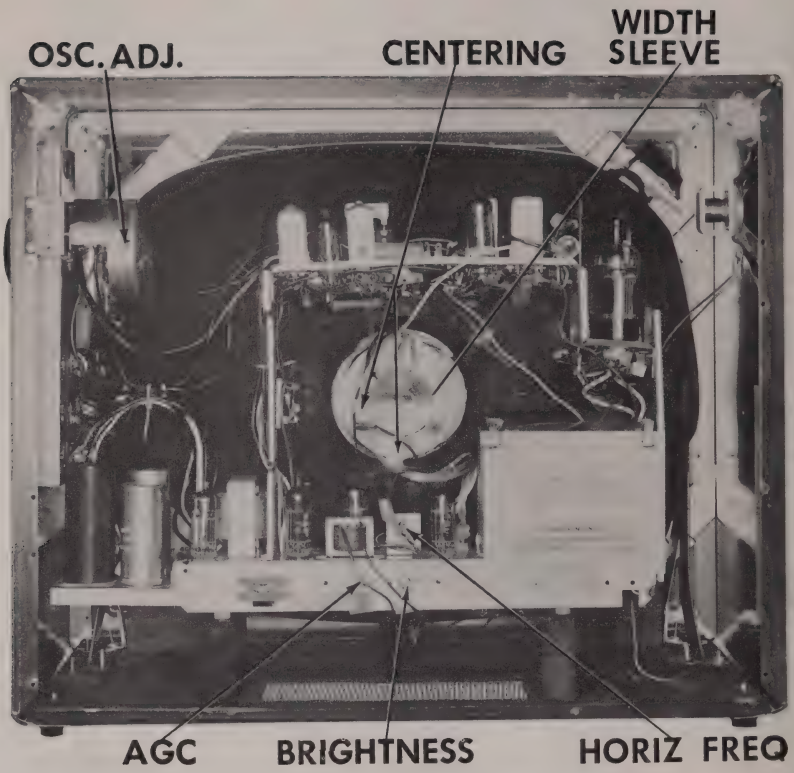
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3DK6	150K	47Ω	10Ω	9Ω	†8200Ω	†8200Ω	0Ω		
V2	3BZ6	.1Ω	56Ω	9Ω	8Ω	▪1800Ω	▪1800Ω	0Ω		
V3	6AW8A	0Ω	100K	▪100K	6Ω	8Ω	●100Ω	6900Ω	▪1200Ω	†7500Ω
V4	3BU8	▪0Ω	†8200Ω	1.8meg	24Ω	23Ω	†40K	†390K	†30K	▪4.7meg
V5	3DT6	18Ω	680Ω	6Ω	5Ω	†330K	▪8200Ω	560K		
V6	12C5 12CU5	¶30K	550K	23Ω	18Ω	NC	†270Ω	†485Ω		
V7	6CG7	●†2.2meg	220K	●160K	15Ω	18Ω	†12K	1.5meg	3300Ω	0Ω
V8	12B4A	●1100Ω	NC	15Ω	10Ω	10Ω	NC	2.2meg	NC	†370Ω
V9	6CG7	†9100Ω	1meg	1500Ω	24Ω	27Ω	†100K	56K	1500Ω	0Ω
V10	12DQ6A	NC	27Ω	NC	†22K	470K	TP	37Ω	33Ω	TOP CAP †16Ω
V11	12AX4GTA	NC	NC	620K	NC	†50Ω	NC	70Ω	63Ω	
V12	1J3	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †455Ω
V13	21DLP4	3Ω	39K	Pin 6 †150K	Pin 10 †150K	Pin 11 ●100K	Pin 12 5Ω			
V201	2BN4A	0Ω	3meg	0Ω	1Ω	▪4300Ω	0Ω	3meg		
V202	5CG8	10K	▪18K	0Ω	3Ω	1Ω	▪4300Ω	▪13K	0Ω	320K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM OUTPUT OF M1. ▪ MEASURED FROM PIN 1 OF V6.
† MEASURED FROM PIN 3 OF V11. NC NO CONNECTION TP TIE POINT



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Set the Brightness and Contrast for a normal picture.

Turn the Horizontal Frequency Slug clockwise until the picture loses sync. It may be necessary to switch off channel and back again for picture to lose sync.

Turn the Horizontal Frequency Slug slowly counterclockwise until the picture just falls into sync.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL MODEL 21MT6045

1. Remove 12 screws holding rear cover.
2. Remove rear cover.
3. Remove 5 push-on type knobs at side of cabinet.
4. Remove antenna terminal bracket.
5. Remove picture tube socket, yoke plug, high voltage lead, and speaker leads.
6. Remove 2 bolts holding chassis wood blocks.
7. Remove 4 screws from side holding tuner and control panel.
8. Remove picture tube-mounting bracket ground lead.
9. Remove chassis.

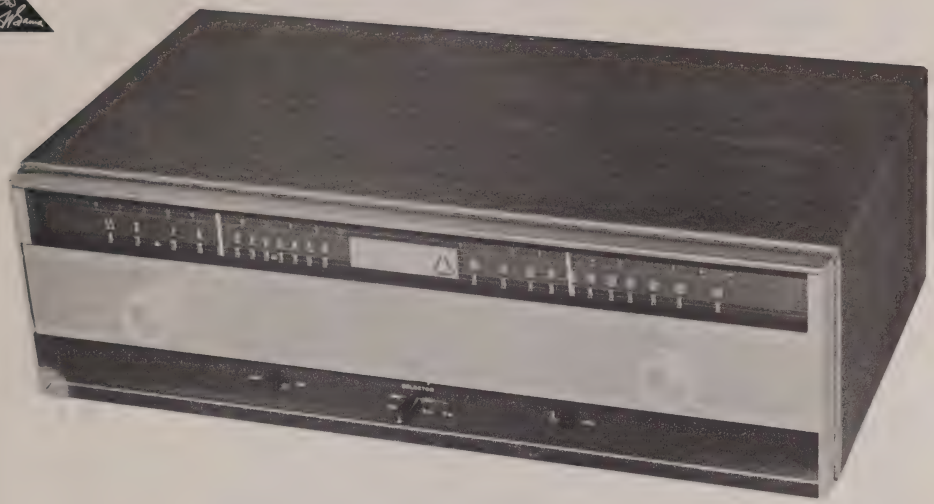
PICTURE TUBE REMOVAL

It is necessary to remove the chassis for picture tube removal.

PHOTOFACT® Folder

**BELL SOUND
MODEL 2421**

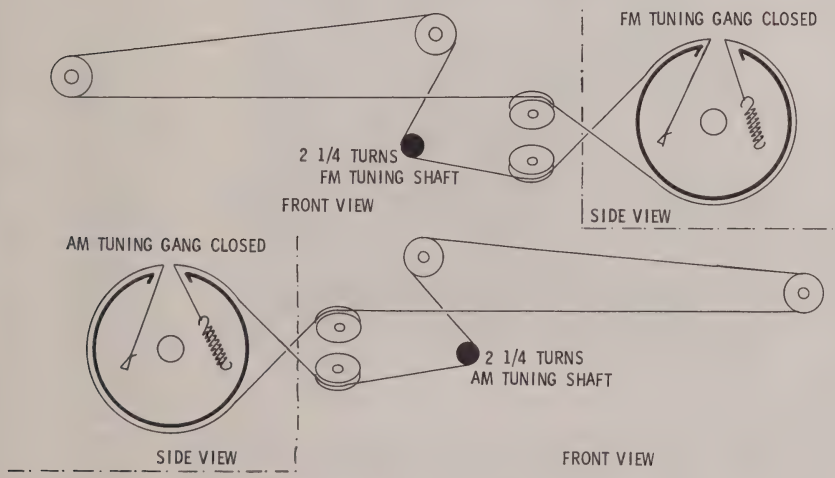
BELL SOUND
MODEL 2421



BELL SOUND
MODEL 2421

TRADE NAME	Bell Sound Model 2421		
MANUFACTURER	Bell Sound Div., Thompson Ramo Wooldridge Inc., 555 Marion Road, Columbus 7, Ohio		
TYPE SET	AC Operated 9 Tube FM-AM Tuner		
POWER SUPPLY	110 – 120 Volts AC, 60 Cycles	RATING	38 Watts, .37 Amp. @117 Volts AC
TUNING RANGE—BROADCAST	540 – 1600KC	FREQ. MOD.	88 – 108MC

DIAL CORD STRINGING



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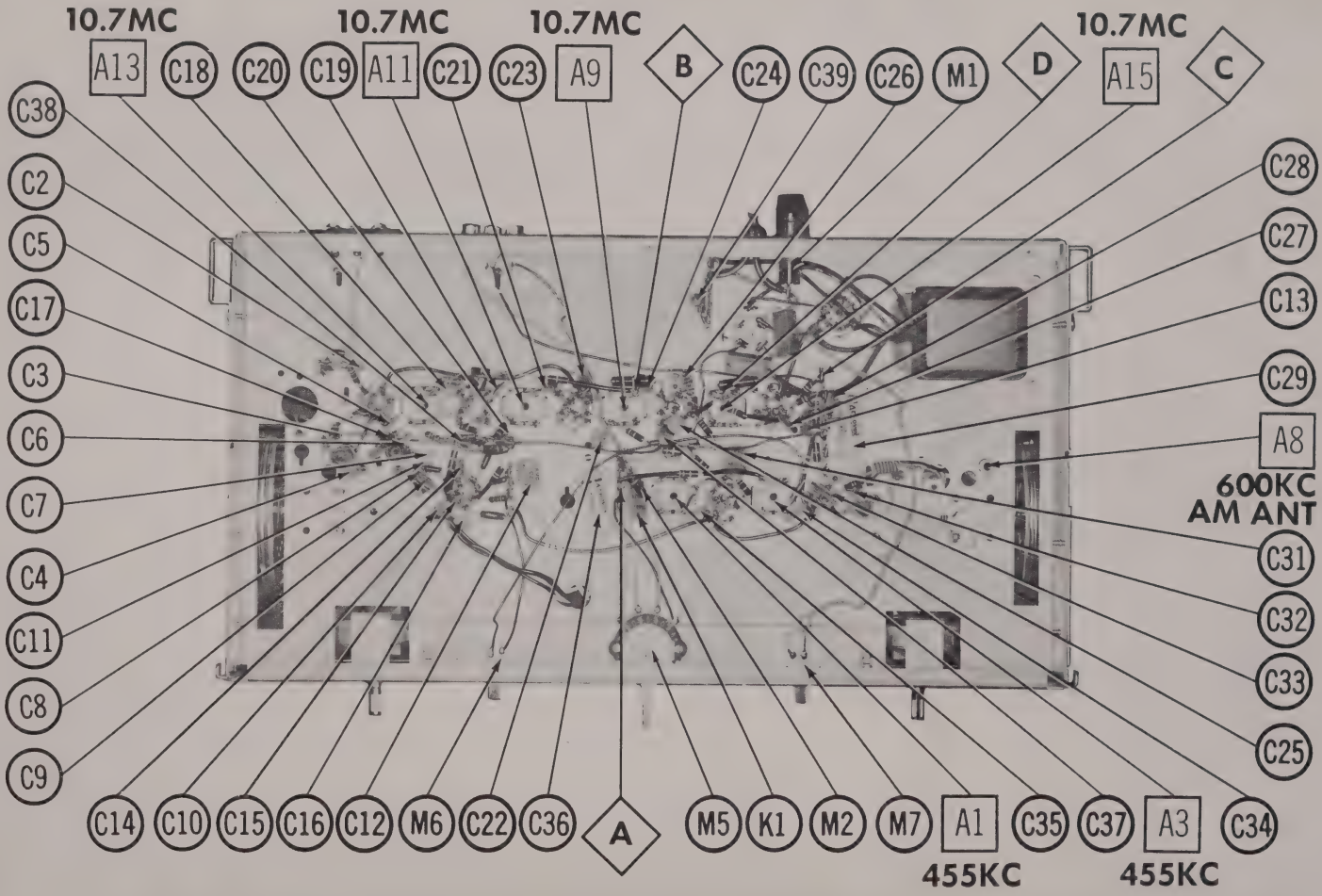
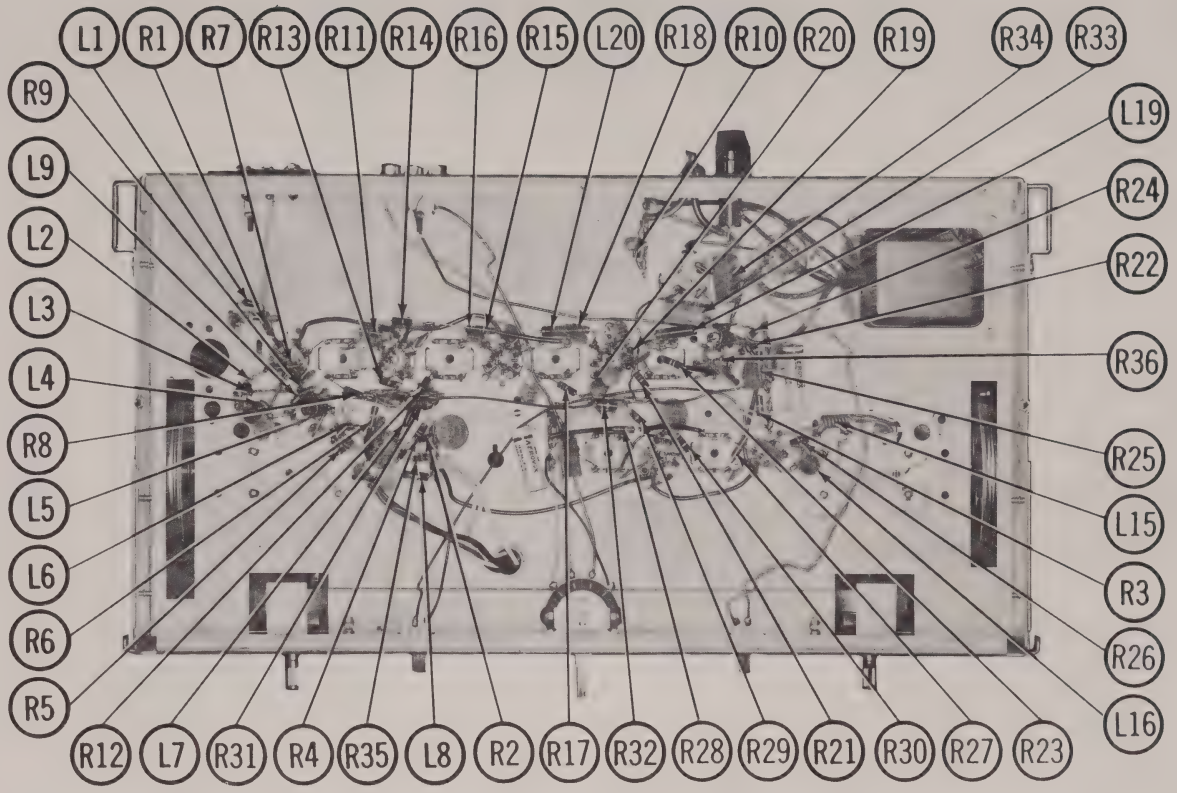
KL447

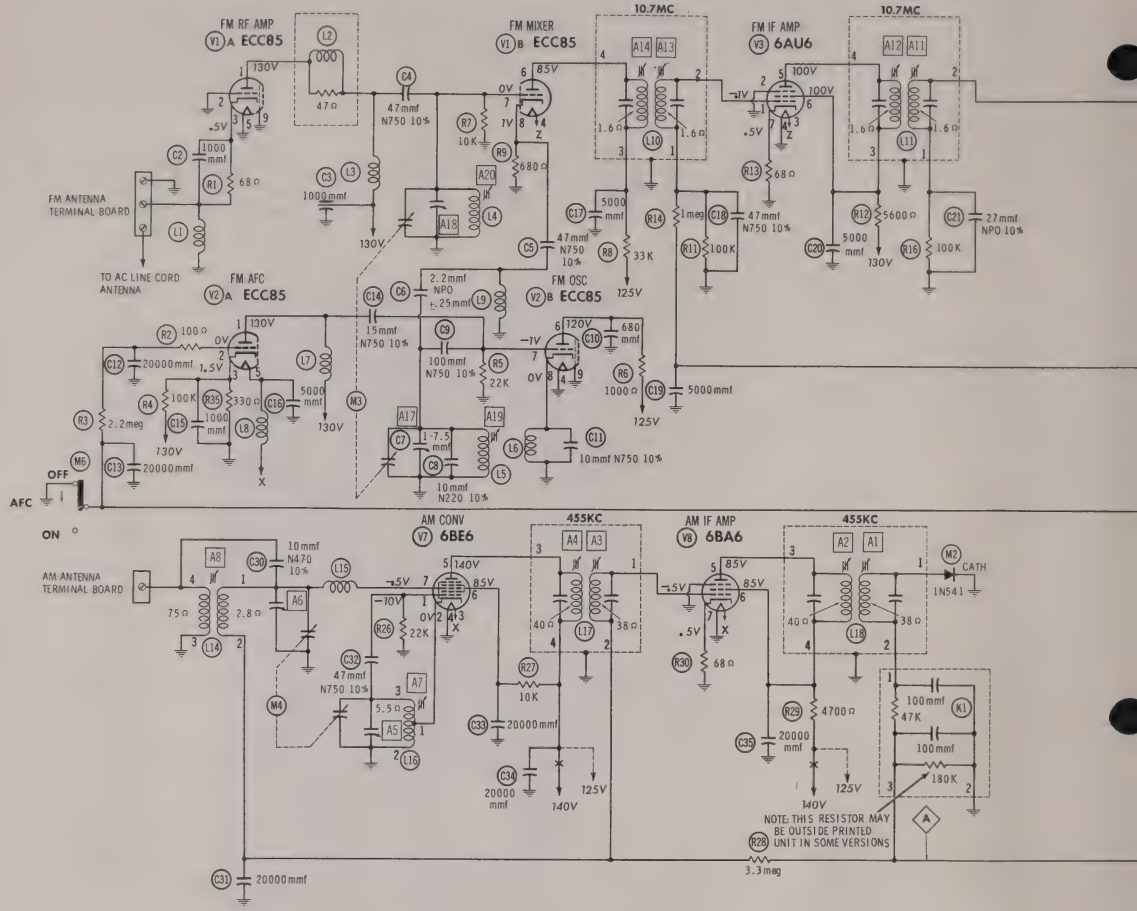
SET 533 FOLDER 3



CHASSIS BOTTOM VIEW-ALIGNMENT, CAPACITOR & MISC. IDENT.



CHASSIS BOTTOM VIEW-RESISTOR & INDUCTOR IDENT.



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC85 6AQ8	†800Ω	0Ω	68Ω	0Ω	.1Ω	†34K	0Ω	680Ω	0Ω
V2	ECC85 6AQ8	†800Ω	3.5meg ■2.2meg	330Ω	.1Ω	0Ω	†2000Ω	22K	0Ω	0Ω
V3	6AU6	100K	0Ω	0Ω	.1Ω	†6400Ω	†6400Ω	68Ω		
V4	6AU6	100K	0Ω	0Ω	.1Ω	†56K	†56K	0Ω		
V5	6AU6	100K	0Ω	0Ω	.1Ω	†30K	†30K	68Ω		
V6	6AL5	0Ω	100K	.1Ω	0Ω	200K	0Ω	100K		
V7	6BE6	22K	.3Ω	0Ω	.1Ω	†500Ω	†10K	3.5meg		
V8	6BA6	3.5meg	0Ω	.1Ω	0Ω	†5200Ω	†5200Ω	68Ω		
V9	EZ80 6V4	82Ω	NC	¶45K	.1Ω	0Ω	NC	89Ω	NC	NC

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
■ MEASURED WITH "AFC" OFF.
† MEASURED FROM PIN 3 OF V9.
NC NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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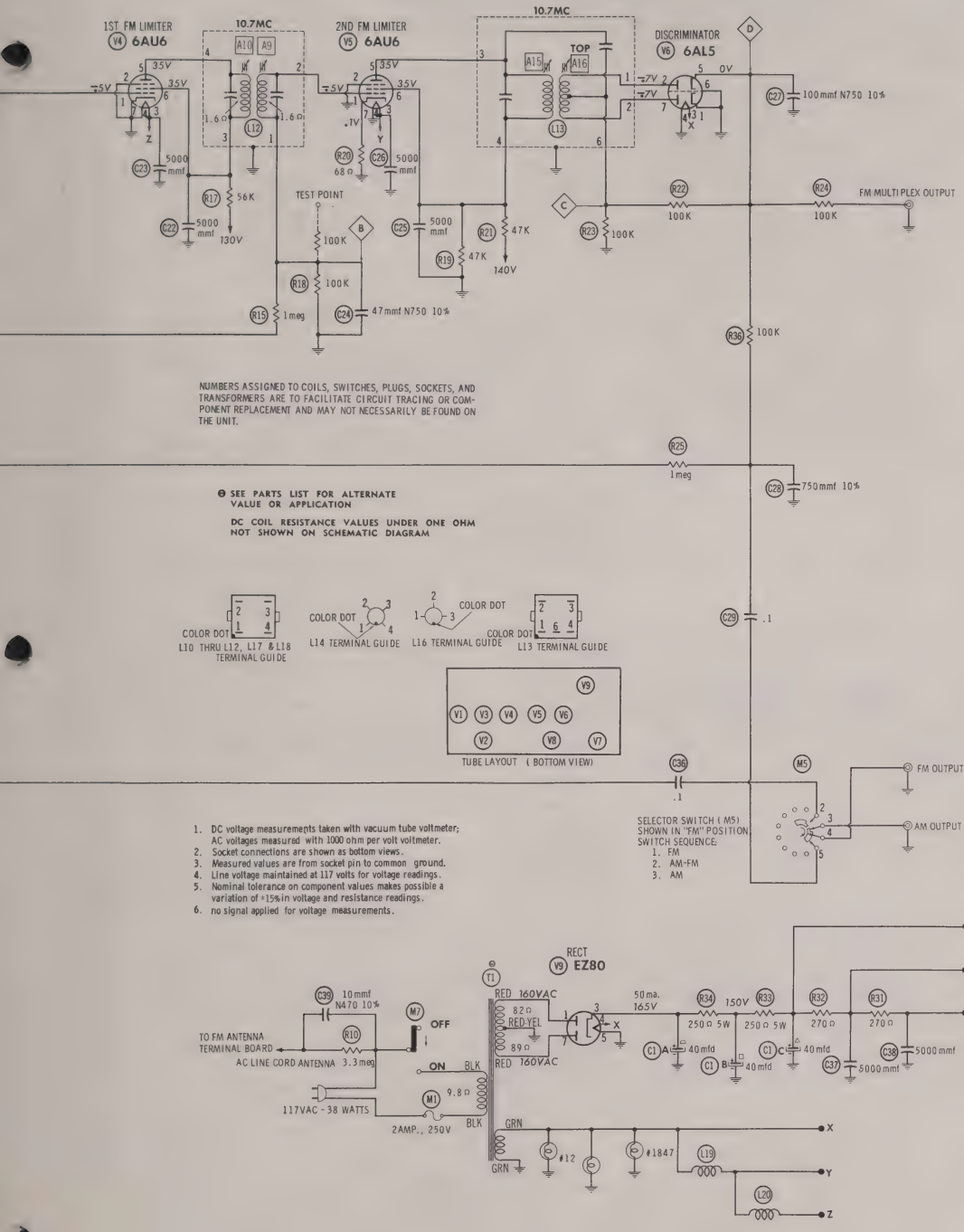


BELL SOUND
MODEL 2421

FOLDER 3

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.

Suggested Alignment Tools:

A1 thru A4, A8 thru A16, A19, A20.... GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545

A5, A6, A17, A18..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

A7..... GENERAL CEMENT #8721, 8722
WALSCO #2519

AM ALIGNMENT – SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .01mfd to pin 7 (grid) of AM Converter. Low side to chassis.	455KC (400% 30% AM)	(AM) Point of non-interference.	DC probe to point (A). Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	High side thru 47mmf to AM antenna terminal. Low side to chassis.	1400KC	1400KC	"	A5, A6	"
3.	"	600KC	600KC	"	A7, A8	Adjust for maximum deflection. Repeat Steps 2 and 3.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM—SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	High side thru .01mfd to pin 7 (grid) of FM Mixer. Low side to chassis.	10.7MC (Unmod.)	(FM) Point of non-interference.	DC probe thru 100K to point (B). Common to chassis.	A9, A10, A11, A12, A13, A14	Adjust for maximum deflection.
5.	"	"	"	DC probe thru 100K to point (C). Common to chassis.	A15	"
6.	"	"	"	DC probe to point (D). Common to chassis.	A16	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE—SELECTOR IN FM POSITION

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	High side thru .01mfd to pin 7 (grid) of FM Mixer. Low side to chassis.	10.7MC (450KC Swp)	(FM) Point of non-interference.	Vert. amp. thru 100K to point (B). Low side to chassis.	A9, A10, A11, A12, A13, A14	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
5.	"	"	"	Vert. amp. thru 100K to point (C). Low side to chassis.	A15	"
6.	"	"	"	Vert. amp. to point (D). Low side to chassis.	A16	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A15 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT – SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	Across FM antenna terminals with 150Ω in each lead.	106MC (Unmod.)	(FM) 106MC	DC probe thru 100K to point (B). Common to chassis.	A17, A18	Adjust for maximum deflection.
8.	"	90MC	90MC	"	A19, A20	Adjust for maximum deflection. Repeat Steps 7 and 8.

FIG. 1

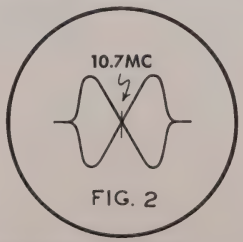


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (• GENERAL ELECTRIC • RAYTHEON • SYLVANIA •)
V1	FM RF Amp. -FM Mixer	ECC85/6AQ8
V2	FM Osc. -AFC	ECC85/6AQ8
V3	FM IF Amplifier	6AU6
V4	1st FM Limiter	6AU6
V5	2nd FM Limiter	6AU6
V6	Discriminator	6AL5
V7	AM Converter	6BE6
V8	AM IF Amplifier	6BA6
V9	Rectifier	EZ80/6V4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA BELL SOUND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	200	23B37	AFH4-01-60		FP327.89	TMQ-4104	TVL-2575	
B	■40	200						TVA-1511	
C	▲40	200							

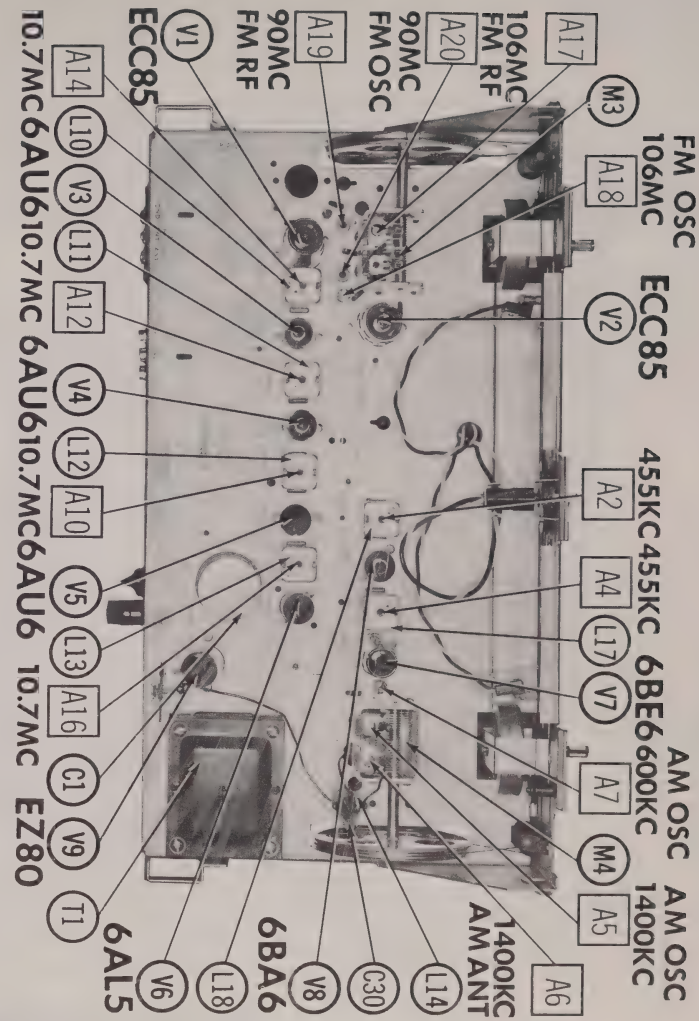
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C3	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C4	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C5	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C6	2.2 NPO ± .25mmf		NPO-DI 2.2	DTZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C7	1-7.5	#25A17		829-7				
C8	10 N220 10%	#24A132				*		10TCR-Q10
C9	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C10	680		DI-680	DD-681	BYA10T68	CCD-681	B-368	10TS-T68
C11	10 N750 10%		N750-DI 10	DTN-10	C10Q1U	CCTN-100	CN7-410	10TCU-Q10
C12	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C13	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C14	15 N750 10%		N750-DI 15	DTN-15	C10Q15U	CCTN-150	CN7-415	10TCU-Q15
C15	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C16	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C17	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C18	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C19	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C20	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C21	27 NPO 10%		NPO-DI 25	TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
C22	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C23	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C24	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-47	CN7-447	10TCU-Q47
C25	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C26	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C27	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C28	750 10%		DI-750	DD-751	5R5T75	CCD-751	GP375	10TS-T75
C29	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C30	10 N470 10%	#24B71				*		
C31	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C32	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C33	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C34	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C35	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C36	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C37	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C38	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C39	10 N470 10%	#24B71				*		

Bell Sound Part Number.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CHASSIS—TOP VIEW



BELL SOUND MODEL 2421

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS
R1	68Ω			
R2	100Ω			
R3	2.2meg			
R4	100K			
R5	22K			
R6	1000Ω			
R7	10K			
R8	33K			
R9	680K			
R10	3.3meg			
R11	100K			
R12	5600Ω			
R13	68Ω			
R14	1meg			
R15	1meg			
R16	100K			
R17	56K			
R18	100K			

ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS
R19	47K			
R20	68Ω			
R21	47K			
R22	100K			
R23	100K			
R24	100K			
R25	1meg			
R26	22K			
R27	10K			
R28	3.3K			
R29	4700Ω			
R30	68Ω			
R31	270Ω			
R32	270Ω			
R33	250Ω 5W	PW5-250	5W-SQ-250	
R34	250Ω 5W	PW5-250	5W-SQ-250	
R35	330Ω			
R36	100K			

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	BELL SOUND PART No.	REPLACEMENT DATA
K1	AM Diode RF Filter	(2) 100mmf, 47K, 180K	57A19	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		BELL SOUND PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	RF Choke (1.1uh)	31A44	BC-561	4602	RTC-8515	T855	① Wound on 47Ω
L2	RF Choke	31A31 ①					
L3	RF Choke (.68uh)	31A24	BC-560	4590	RTC-8514	T803	
L4	FM RF	31A52					
L5	FM Osc.	31A52					
L6	RF Choke (1.8uh)	31A53	BC-562	4604	RTC-8516	T856	
L7	RF Choke (2.5uh)	31A22	BC-563	4606	RTC-8517	T857	
L8	Fil. Choke (5.5uh)	31A18	SW-631	4609	RTC-8519	T859	
L9	RF Choke (5.5uh)	31A18	SW-631	4609	RTC-8519	T859	
L10	1st FM IF	32C81	FM-254	1463	RTC-8599	T633	
L11	2nd FM IF	32C81	FM-254	1463	RTC-8599	T633	
L12	3rd FM IF	32C81	FM-254	1463	RTC-8599	T633	
L13	Discriminator	32C117	FM-253	1464	RTC-8665	T634	
L14	AM Ant.	32A39	BC-386	70-A	RTC-8731	T500	
L15	RF Choke (1uh)	31A61	BC-561	4602	RTC-8515	T855	
L16	AM Osc.	31A50	BC-393	69-OSC	RTC-8646	T503	
L17	1st AM IF	32C99	BC-352	12-C1	RTC-8632	T607	
L18	2nd AM IF	32C99	BC-353	12-C2	RTC-8633	T608	
L19	Fil. Choke	31A21	BC-564	4608	RTC-8518	T858	
L20	Fil. Choke	31A21	BC-564	4608	RTC-8518	T858	

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	BELL SOUND PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	117V ⓐ .37A	320VCT ⓐ .050A	6.3V ⓐ 3.5A	32B116 ①					① Part #32B129 used for 50 cycle operation.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			BELL SOUND PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	2A 250V	53A9	53A8	3i2002 (3AG 2A 250V)	342001	AGC 2	HKP

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		BELL SOUND PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N541	42A14		1N295	1N295	AM Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	BELL SOUND PART No.	NOTES
M3	Tuning Cap	25B18	FM, 2 Gang
M4	Tuning Cap	25B20	AM, 2 Gang (Ant. 16-385, Osc. 18-126mmf)
M5	Switch	43B88	Function Selector (Lever Type)
M6	Switch	43A67	AFC (SPDT Slide Type)
M7	Switch	43A92	Power Off-On (SPDT Slide Type)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial Glass	94C71	
Dial Pointer	77A72	
Knob	84A60	Tuning
Knob	84A62	Selector

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT® Folder

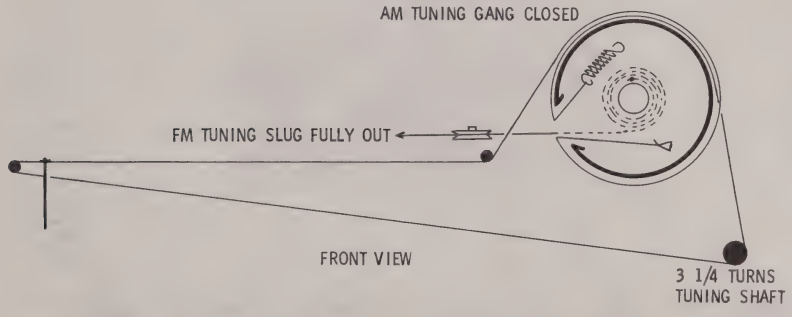
CURTIS MATHES MODEL 2918 (Ch. 18)

CURTIS MATHES MODEL
2918 (Ch. 18)

CURTIS MATHES MODEL
2918 (Ch. 18)

TRADE NAME	Curtis Mathes Model 2918 (Ch. 18)		
MANUFACTURER	Curtis Mathes Mfg. Co., 2220 Young Street, Dallas, Texas		
TYPE SET	AC Operated 9 Tube FM-AM Receiver		
POWER SUPPLY	110 – 120 Volts AC, 60 Cycles	RATING	54 Watts, .5 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535 – 1620KC	FREQ. MOD.	88 – 108MC

DIAL CORD STRINGING



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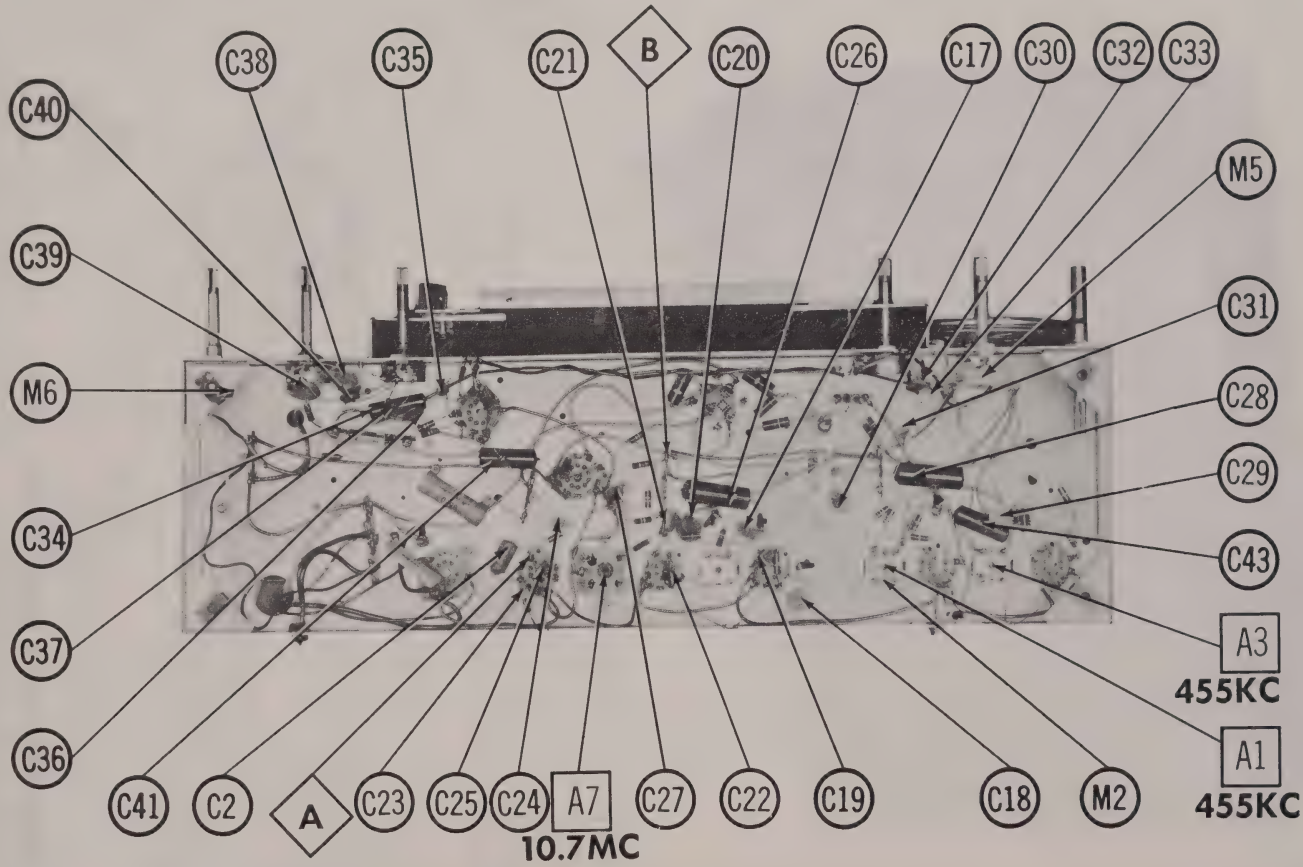
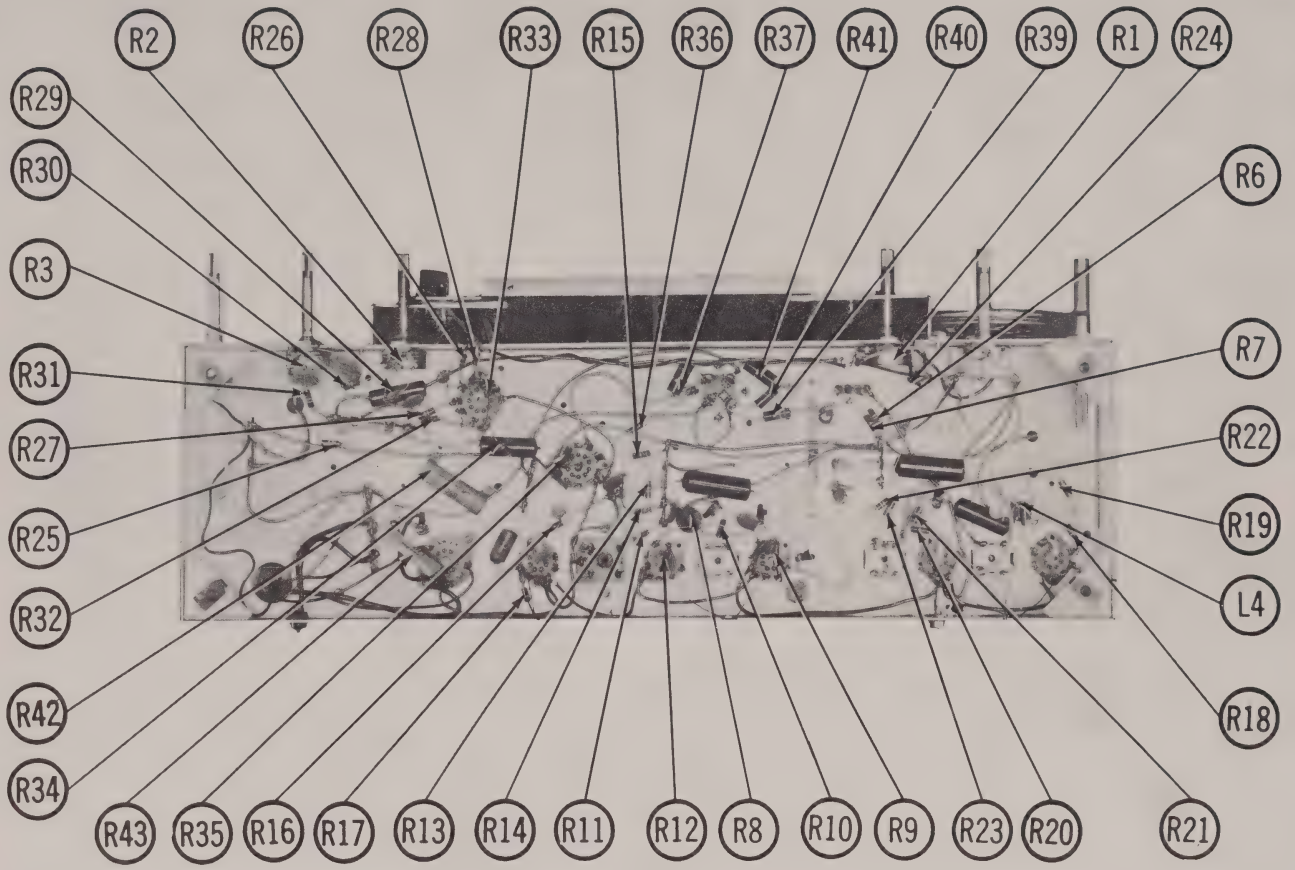
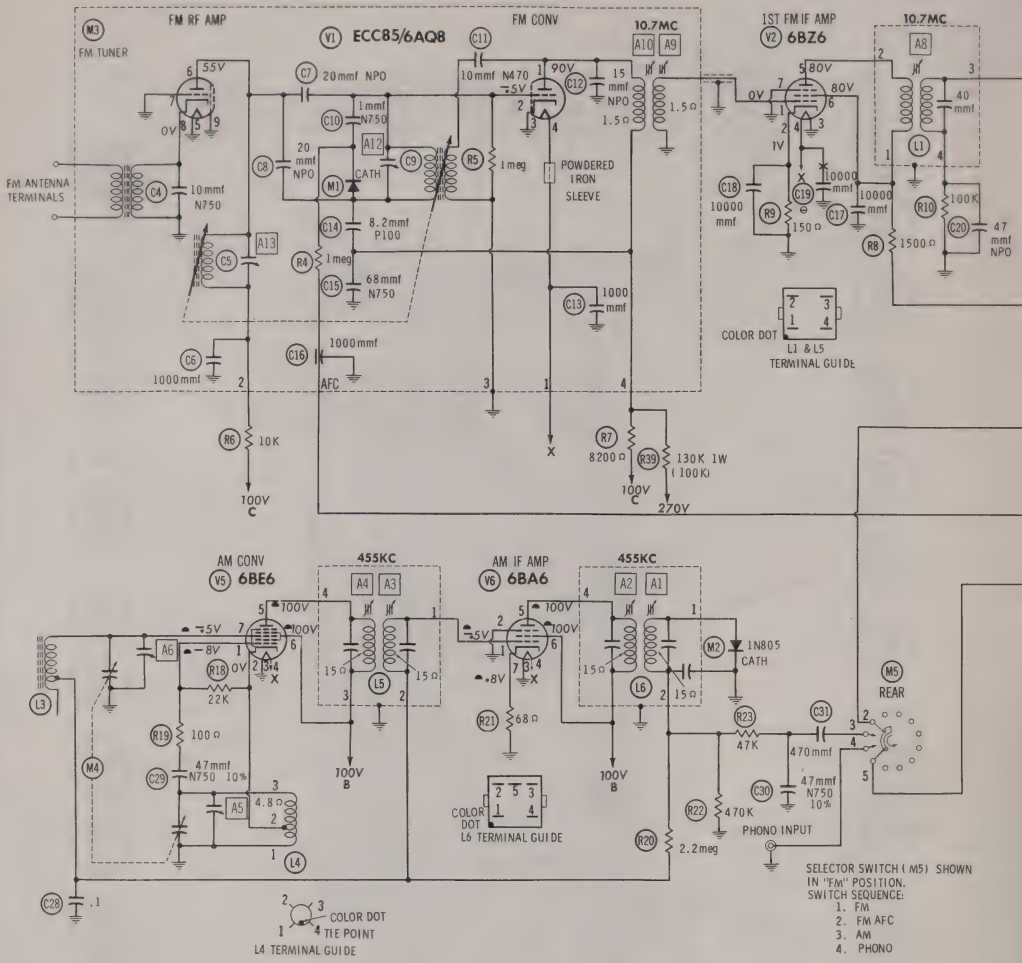


CHASSIS BOTTOM VIEW-ALIGNMENT, CAPACITOR & MISC. IDENT.



CHASSIS BOTTOM VIEW-RESISTOR INDUCTOR IDENT.



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC85 6AQ8	†18K	800K	0Ω	.1Ω	0Ω	†20K	0Ω	.1Ω	0Ω
V2	6BZ6	1.5Ω	150Ω	0Ω	.1Ω	†12K	†12K	0Ω		
V3	6AU6	100K	0Ω	0Ω	.1Ω	†11K	†11K	220Ω		
V4	6AL5	1.3meg ▪100K	1.3meg ▪100K	.1Ω	0Ω	9100Ω	0Ω	9100Ω		
V5	6BE6	22K	.1Ω	0Ω	.1Ω	▲†10K	▲†10K	2.7meg		
V6	6BA6	2.7meg	0Ω	.1Ω	0Ω	▲†10K	▲†10K	68Ω		
V7	6EU7	.1Ω	0Ω	NC	560Ω	200K	†340K	†190K	6.8meg	1500Ω
V8	6BQ5	NC	100K	270Ω	0Ω	.1Ω	NC	†1050Ω	NC	†1600Ω
V9	6CA4	97Ω	NC	¶200K	.1Ω	0Ω	NC	88Ω	NC	NC

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
▲ MEASURED IN "AM" POSITION.
▪ MEASURED WITH "AFC" OFF.
† MEASURED FROM PIN 3 OF V9.
NC NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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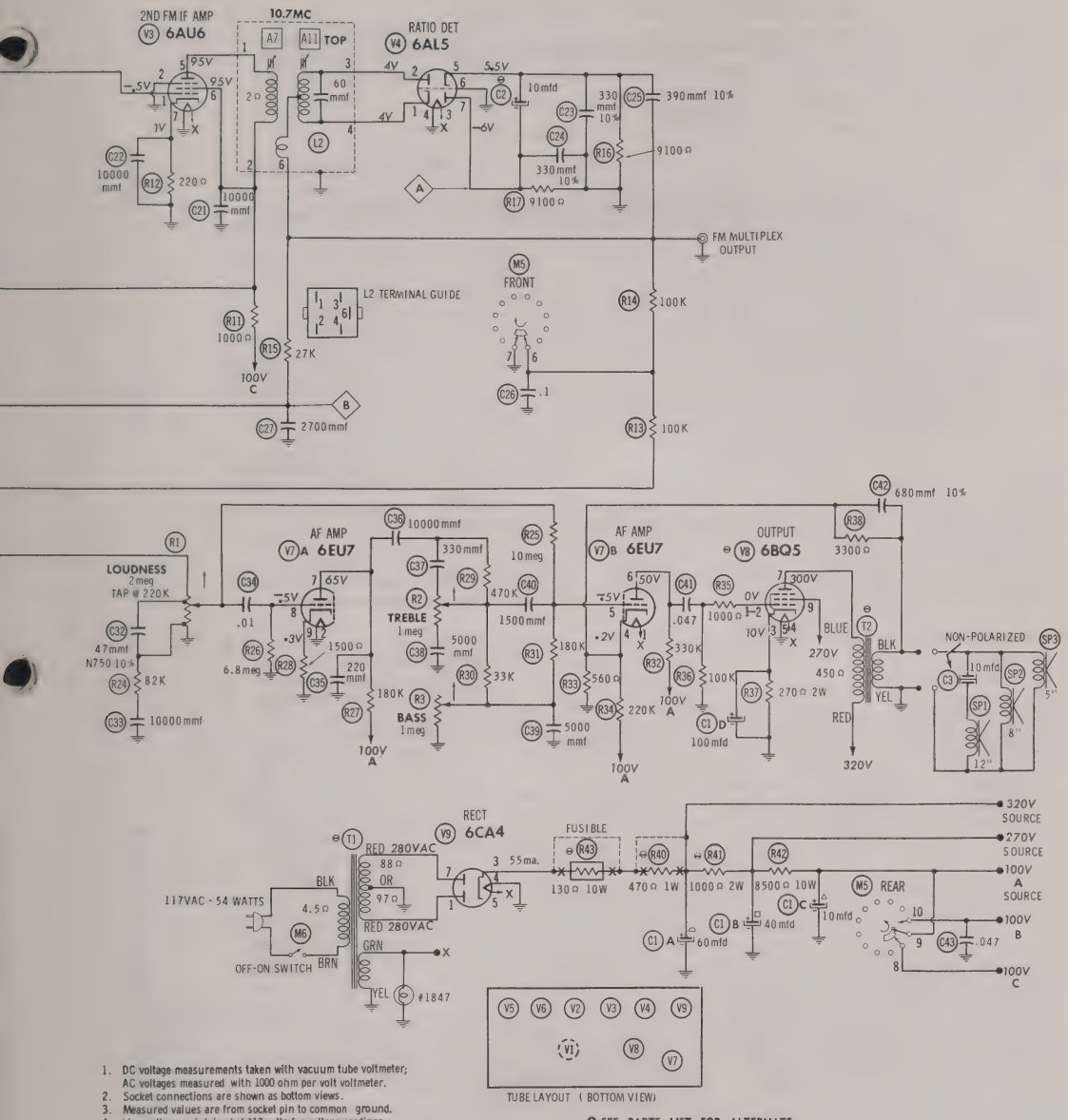


1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

CURTIS MATHES MODEL 2918 (Ch. 18)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:

A1 thru A4, A8... GENERAL CEMENT #5097, 8727
WALSCO #2515

A5, A6..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

A7, A11..... GENERAL CEMENT #5003, 8271, 8275, 8276, 8609, 8721, 8722, 9150, 9298
WALSCO #2516, 2518, 2519

A9, A10..... GENERAL CEMENT #9440

A12, A13..... GENERAL CEMENT #5004, 5009, 8195, 8274, 8275, 8607, 8728, 8987, 8988, 8989, 9291
WALSCO #2515, 2520, 2522, 2523, 2531, 2532, 2534, 2537, 2538

AM ALIGNMENT – SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to antenna stator lug of AM tuning gang. Low side to chassis.	455KC (400~ Mod.)	(AM) Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	"	1620KC	"	"	A5	"
3.	Loop	1400KC	1400KC Signal.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Set pointer to 1400KC.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM–SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	Across FM antenna terminals.	10.7MC (Unmod.)	(FM) Point of non-interference.	DC probe to point (A). Common to chassis.	A7, A8, A9, A10	Adjust for maximum deflection.
5.	"	"	"	DC probe to point (B). Common to chassis.	All	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE–SELECTOR IN FM POSITION

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	Across FM antenna terminals.	10.7MC (450KC Swp)	(FM) Point of non-interference.	Vert. amp. to point (A). Low side to chassis.	A7, A8, A9, A10	Disconnect stabilizing capacitor C2. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C2.
5.	"	"	"	Vert. amp. to point (B). Low side to chassis.	All	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT – SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	Across FM antenna terminals with 120Ω in each lead.	100MC (Unmod.)	(FM) 100MC	DC probe to point (A). Common to chassis.	A12, A13	Adjust for maximum deflection.

FIG. 1

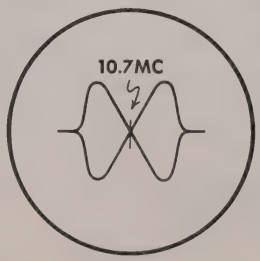


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (GENERAL ELECTRIC • RAYTHEON • SYLVANIA)
V1	FM RF Amp. -FM Conv.	ECC85/6AQ8
V2	1st FM IF Amplifier	6BZ6
V3	2nd FM IF Amplifier	6AU6
V4	Ratio Detector	6AL5
V5	AM Converter	6BE6
V6	AM IF Amplifier	6BA6
V7	AF Amplifier	6EU7
V8	Output	6BQ5 (EL84) *
V9	Rectifier	6CA4

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	Curtis Mathes PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲60	400	4A4	AFHS4-57-93	D0477.5	FP454.8	TMT-3679 TD-50-450	TVLS-4670.8*	
B	■40	400							
C	▲10	400							
D	100	25							
C2	10	25		PRS1250	BBR10-25	TC22	TD-10-25	TVA-1204	①
C3	10	25NP		PRS7315	BBR10-150	TCN5010		TVANS-1204.1*	

① Some versions may use 8mfd@25V in this application (Part #4A18).
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

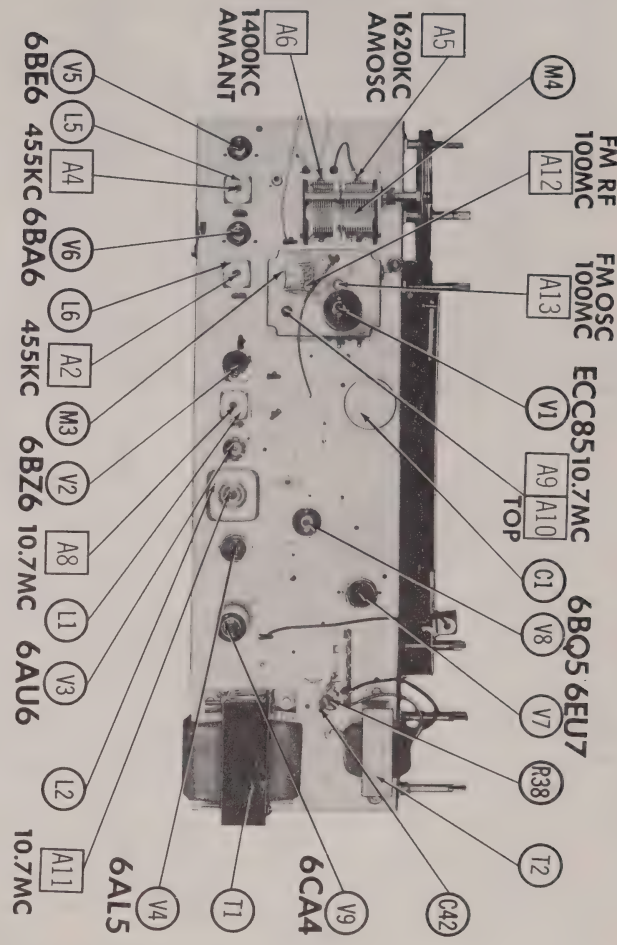
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C4	10 N750		N750-SI 10	TCN-10	C10QIU	CCTN-100	CN7-410	10TCU-Q10
C5								
C6	1000		SI 1000	D6-102	BYA10D1	CCD-102	B-210	5HK-D10
C7	20 NPO		NPO-SI 20	TCZ-20	C10Q2C	CCTO-200	CNO-422	10TCC-Q20
C8	20 NPO		NPO-SI 20	TCZ-20	C10Q2C	CCTO-200	CNO-422	10TCC-Q20
C9								
C10	1 N750							
C11	10 N470					•		
C12	15 NPO		NPO-S15	TCZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C13	1000		SI 1000	D6-102	BYA10D1	CCD-102	B-210	5HK-D10
C14	8.2 P100					•		
C15	68 N750		N750-SI 68	TCN-68	C10Q68U	CCTN-680	CN7-468	10TCU-Q68
C16	1000		EF-001	MFT-1000		CCF-102	CT280A	
C17	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C18	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C19	10000	Note 1	BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C20	47 NPO		NPO-DI 47	DTZ-47	C10Q47C	CCTO-470	CNO-447	10TCC-Q47
C21	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C22	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C23	330 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C24	330 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C25	390 10%		DI-390	DD-391	L10T39	CCD-391	GP339	10TS-T39
C26	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C27	2700		DI-2700	DD-272	BYA10D27	CCD-272	B-227	10TS-D27
C28	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C29	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C30	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C31	470		DI-470	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C32	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C33	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C34	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S10
C35	220		DI-220	DD-221	L10T22	CCD-221	B-322	10TS-T22
C36	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C37	330		DI-330	DD-331	L10T33	CCD-331	B-333	10TS-T33
C38	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C39	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C40	1500		BPD-0015	DD-152	BYA10D15	CCD-152	B-215	5HK-D15
C41	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C42	680 10%		DI-680	DD-681	5R5T68	CCD-681	GP368	10TS-T68
C43	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47

Note 1. Not used in some versions.

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Curtis Mathes PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	2meg 220K Tap	½	2A42	BT-81	A47F4-2meg	Q17-139X	UT-448	Loudness
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2A	1meg	½	2A41	B-70	A47-1meg-Z	Q13-137	U53	Treble
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	1meg	½	2A41	B-70	A47-1meg-Z	Q13-137	U53	Bass
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS
R4	1meg			
R5	1meg			
R6	10K			
R7	8200Ω			
R8	1500Ω			
R9	150Ω			
R10	100K			
R11	1000Ω			
R12	220Ω			
R13	100K			
R14	100K			
R15	27K			
R16	9100Ω			
R17	9100Ω			
R18	22K			
R19	100Ω			
R20	2.2meg			
R21	68Ω			
R22	470K			
R23	47K			
R24	82K			
R25	10meg			
R26	6.8meg			
R27	180K			
R28	1500Ω			
R29	470K			
R30	33K			
R31	180K			
R32	330K			
R33	560Ω			
R34	220K			
R35	1000Ω			
R36	100K			
R37	270Ω 2W			
R38	3300Ω			
R39	130K 1W			
R40	470Ω 1W			Note 1
R41	1000Ω 2W			Note 1
R42	8500Ω 10W	PW10-8500	10W-SQ-8500	
R43	130Ω 10W	PW10-130	10W-SQ-130	Note 2

Note 1. When R40 is 1500Ω, R41 is not used.
Note 2. Not used in some versions.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		Curtis Mathes PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	2nd FM IF	1A10	FM-254	1463	RTC-8599	T633	
L2	Ratio Detector	1A9	FM-252	1465	RTC-8600	T635	
L3	Loopstick	1A35	BC-418	705-A		T532	
L4	AM Osc.	1A36	BC-393	69-OSC	RTC-8646	T503	
L5	1st AM IF	1A7	BC-352	12-C1	RTC-8632	T607	
L6	2nd AM IF	1A8	BC-355	12-C6	RTC-8634	T609	

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	Curtis Mathes PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	117V ⓐ ⓐ.5A	560VCT ⓐ.055A	6.3V ⓐ 4A	12A10-1 ①	P-3148 ②	PC-8405 ②	24R20U ② ③	R-112A ③ ②	① Alternate Part # 12A12. ② Drill New Mounting Hole (s). ③ Tape 5V & CT on 6.3V Windings.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	Curtis Mathes PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	7300Ω	2-4Ω	10A15-3A ①	A-2905	A-3824	22S62	S-9X	① Alternate Part #10A15-5.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Curtis Mathes PART No.	QUAM PART No.	
SP1	12"	PM	3-4Ω	12JB-38A	12A6A	
SP2	8"	PM	6-8Ω	8EV-39	8A1Z8.4	
SP3	5"	PM	6-8Ω	5CM-98	5A15Z7.8	

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		Curtis Mathes PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M1	1N805			1N60	1N60	AFC (Part of FM Tuner)
M2						AM Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	Curtis Mathes PART No.	NOTES
M3	Tuner	7A4	FM, Complete
M4	Tuning Cap.	3A8	AM, 2 Gang (Ant. 35—350mmf, Osc. 16—117mmf)
M5	Switch	6A25	Function (Rotary Type)
M6	Switch		Power Off-On

CABINETS & CABINET PARTS

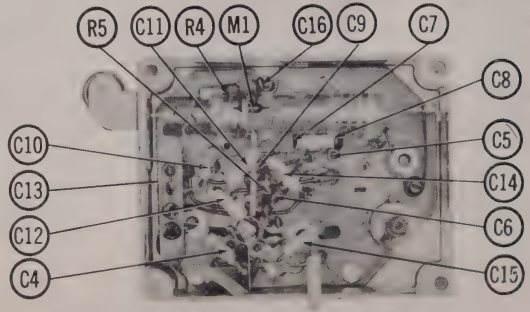
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial Glass	2B14	
Dial Pointer	2B1-3	
Knob	1B4	Tuning
Knob	1B3	Volume, Bass, Treble, On-Off, Function Selector

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



FM RF SUBCHASSIS

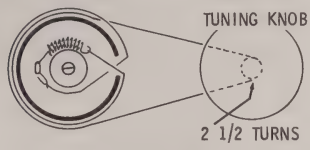
PHOTOFACT® Folder with CIRCUITRACE®

LAFAYETTE
MODEL FS-91

LAFAYETTE
MODEL FS-91

DRIVE CORD STRINGING

TUNING GANG FULLY COUNTER CLOCKWISE



FRONT VIEW

LAFAYETTE
MODEL FS-91

TRADE NAME	LaFayette Model FS-91
SUPPLIER	LaFayette Radio, 165 – 08 Liberty Ave., Jamaica 33, N. Y.
TYPE SET	Battery Operated Transistorized Portable AM Receiver
POWER SUPPLY	3 Volts DC RATING 13MA @ 3 Volts DC (No Signal, Min. Volume)
TUNING RANGE—BROADCAST	540 – 1600KC 25MA @ 3 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
A1, A2, A3.....GENERAL CEMENT #5004, 5009, 8195, 8274, 8275, 8607, 8728, 8987, 8988, 8989, 9291
WALSCO #2515, 2520, 2522, 2523, 2531, 2532, 2534, 2537, 2538
A4, A7.....GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528
A5.....GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	1600KC	1600KC	"	A4	"
3.	"	600KC	600KC	"	A5, A6	"
4.	"	1400KC	1400KC Signal.	"	A7	Adjust for maximum output. Repeat Steps 2, 3 and 4.

SET 533 FOLDER 5

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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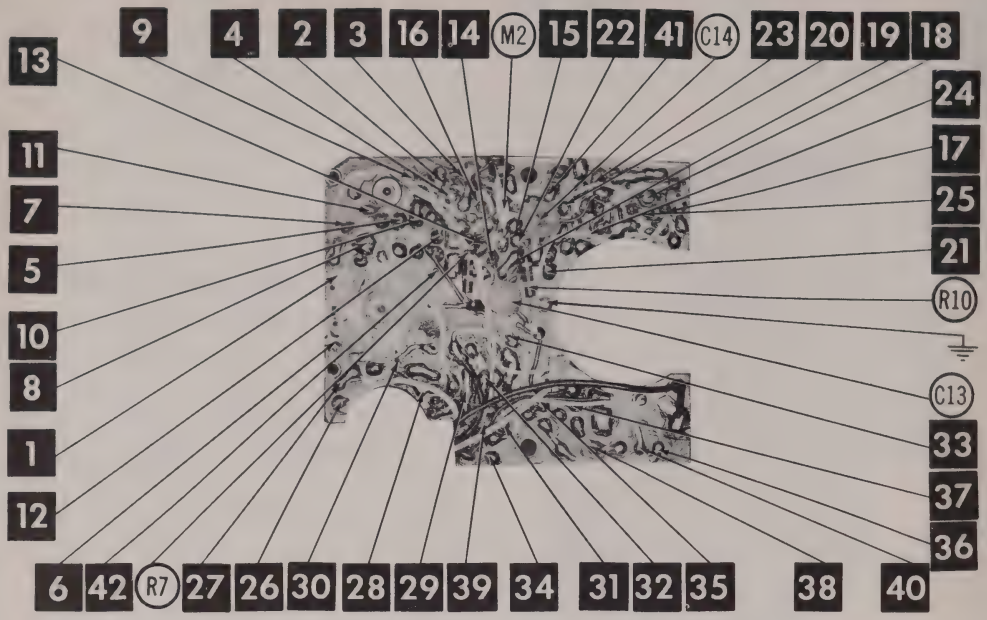

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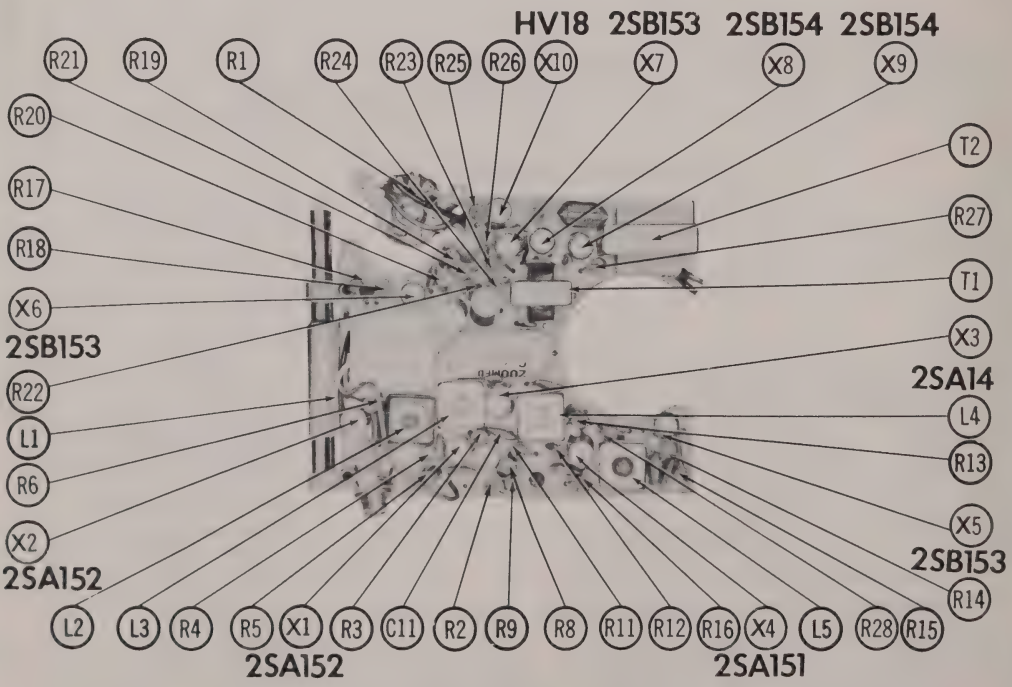
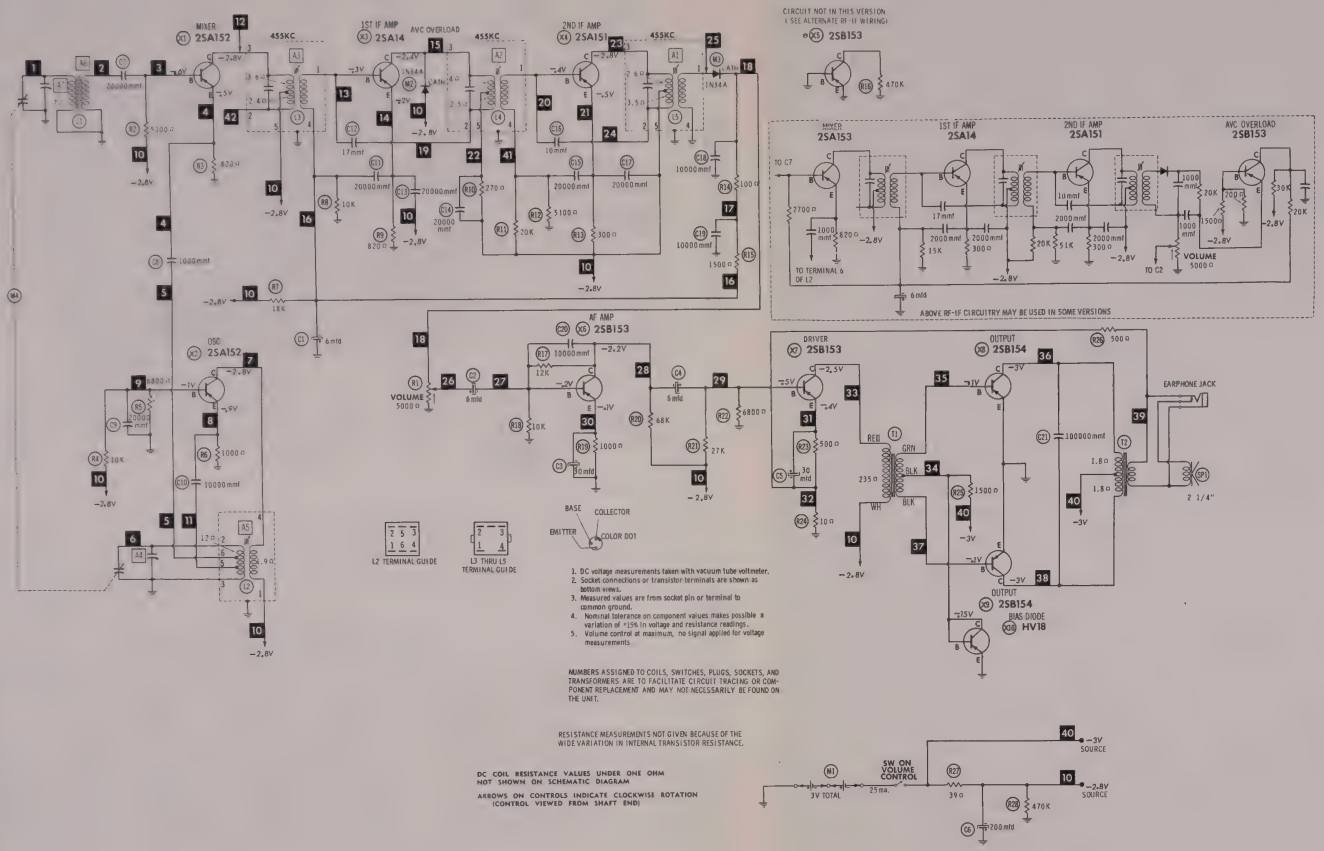


CHASSIS TOP VIEW-RESISTOR, INDUCTOR & TRANSISTOR IDENT.



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LAFAYETTE
MODEL FS-91

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2SA152	Mixer	2N412			PNP
X2	2SA152	Oscillator	2N412			PNP
X3	2SA14	1st IF Amplifier	2N410			PNP
X4	2SA151	2nd IF Amplifier	2N410			PNP
X5	2SB153	Not Used (Note 1)	2N406			PNP
X6	2SB153	AF Amplifier	2N406			PNP
X7	2SB153	Driver	2N406			PNP
X8	2SB154	Output	2N408			PNP
X9	2SB154	Output	2N408			PNP
X10	HV-18	Bias Diode	1N2326			

Note 1. In some versions, X5 is connected for AVC-Overload.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	LAFAYETTE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	6	3		XPP-3006	NLW6-15	TT10X6	MLV5-3	TE-1052, 3	
C2	6	3		XPP-3006	NLW6-15	TT10X6	MLV5-3	TE-1052, 3	
C3	30	3		PTT-3030	NLW30-6		MLV30-6	TE-1092	
C4	6	3		XPP-3006	NLW6-15	TT10X6	MLV5-3	TE-1052, 3	
C5	30	3		PTT-3030	NLW30-6		MLV30-6	TE-1092	
C6	200	6		PTT-6200			MLV-150-6		

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C7	20000		C80V203AM	DA-203	H-05S2		TA-120	TG-S20
C8	1000		C80V102AM	DM-102	H-05D1	CCD-102	B-210	5HK-D10
C9	20000		C80V203AM	DA-203	H-05S2		TA-120	TG-S20
C10	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10
C11	20000		C80V203AM	DA-203	H-05S2		TA-120	TG-S20
C12	17		NPO-D1 20	TCZ-18	C10Q18C	CCTO-180	CNO-418	10TCC-Q18
C13	20000		C80V203AM	DA-203	H-05S20		TA-120	TG-S20

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C14	20000		C80V203AM	DA-203	H-05S20		TA-120	TG-S20
C15	20000		C80V203AM	DA-203	H-05S20		TA-120	TG-S20
C16	10		NPO-D1 10	TCZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C17	20000		C80V203AM	DA-203	H-05S20		TA-120	TG-S20
C18	10000		C80V103AM	DM-103	H-05S10		TA-110	TG-S10
C19	10000		C80V103AM	DM-103	H-05S10		TA-110	TG-S10
C20	10000		C80V103AM	DM-103	H-05S10		TA-110	TG-S10
C21	100000		C80V104AM	DA-104	H-05P1		TA-010	TG-P10

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	LAFAYETTE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/10		Bi6-214				Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R2	5100Ω				R16	470K			
R3	820Ω				R17	12K			
R4	10K				R18	10K			
R5	6800Ω				R19	1000Ω			
R6	1000Ω				R20	68K			
R7	18K				R21	27K			
R8	10K				R22	6800Ω			
R9	820Ω				R23	500Ω			
R10	270Ω				R24	10Ω			
R11	20K				R25	1500Ω			
R12	5100Ω				R26	500Ω			
R13	300Ω				R27	39Ω			
R14	100Ω				R28	470K			
R15	1500Ω								

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		LAFAYETTE PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	Loopstick						
L2	Osc.						
L3	1st IF						
L4	2nd IF						
L5	3rd IF						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	LAFAYETTE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.6	1						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	LAFAYETTE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	100Ω CT	6-8Ω						

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	LAFAYETTE PART No.	QUAM PART No.	
SP1	2 1/4"	PM	6-8Ω		22A06Z8 *	* Fabricate Mounting Brackets.

BATTERIES

ITEM No.	VOLTAGE	LAFAYETTE PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	1.5V	UM-3A		930		1015		M-15R	2 Required

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		LAFAYETTE PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N34A			1N34A	1N34A	Overload
M3	1N34A			1N34A	1N34A	Detector-AVC

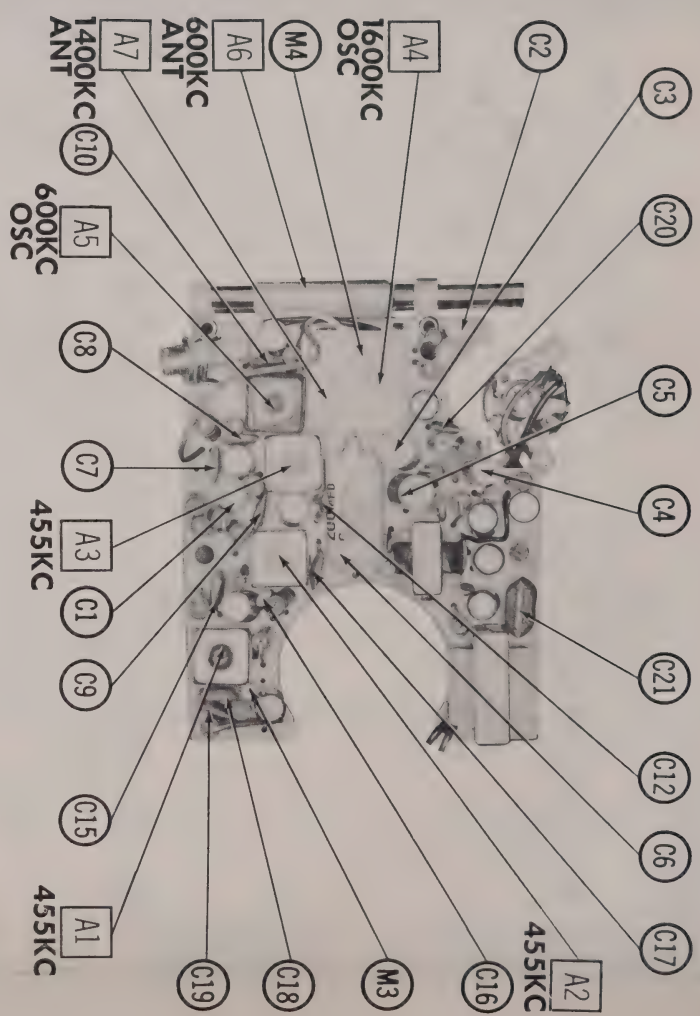
MISCELLANEOUS

ITEM No.	PART NAME	LAFAYETTE PART No.	NOTES
M4	Tuning Cap		2 Gang

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT® Folder

**MADISON FIELDING
MODEL SERIES 360**

MADISON FIELDING
MODEL SERIES 360

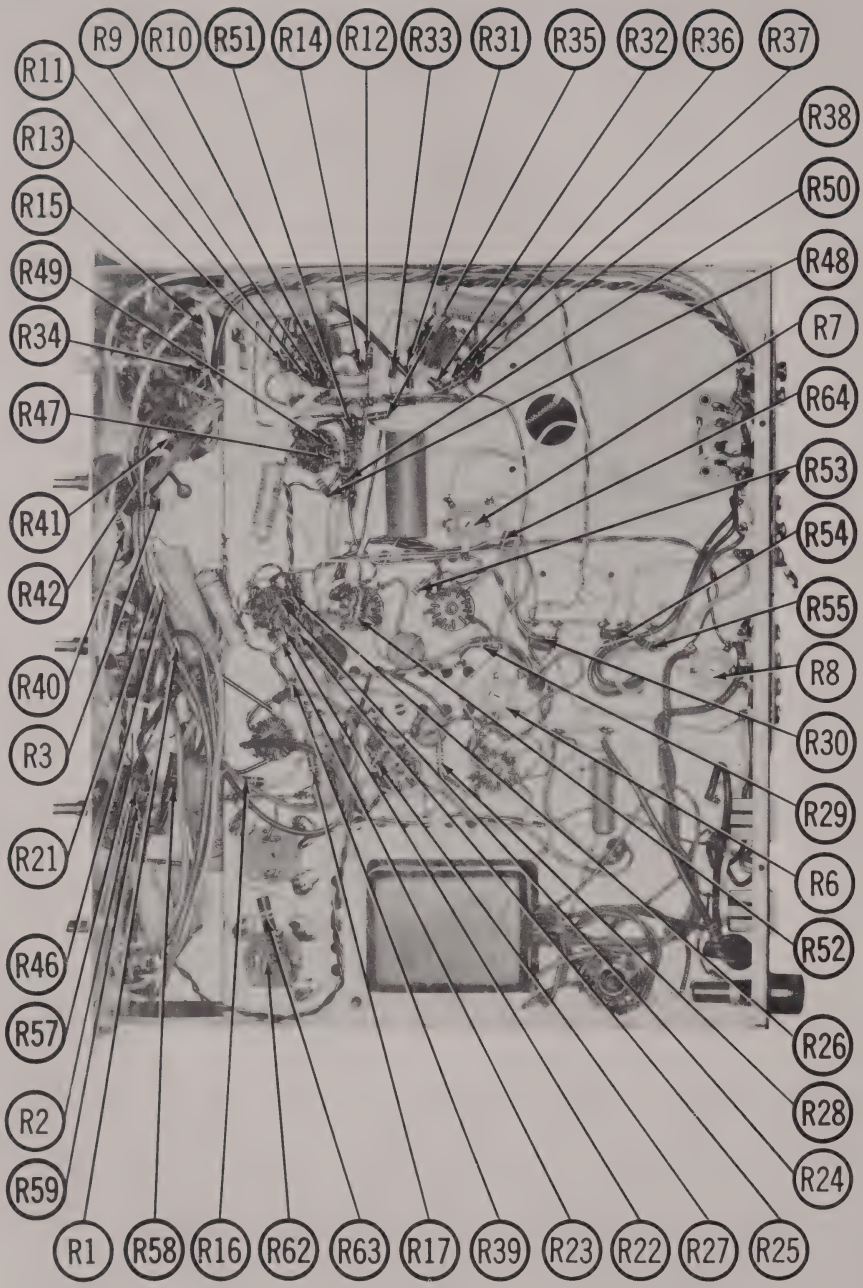
MADISON FIELDING
MODEL SERIES 360

TRADE NAME	Madison Fielding Model Series 360
MANUFACTURER	Crosby Electronics, Inc., Subsidiary of Crosby-Teletronics Corp., 135 Eileen Way, Syosset, L.I., N.Y.
TYPE SET	AC Operated 10 Tube Stereo Amplifier
POWER SUPPLY	105 – 125 Volts AC, 60 Cycles RATING 125Watts, 1.15 Amp. @117 Volts AC

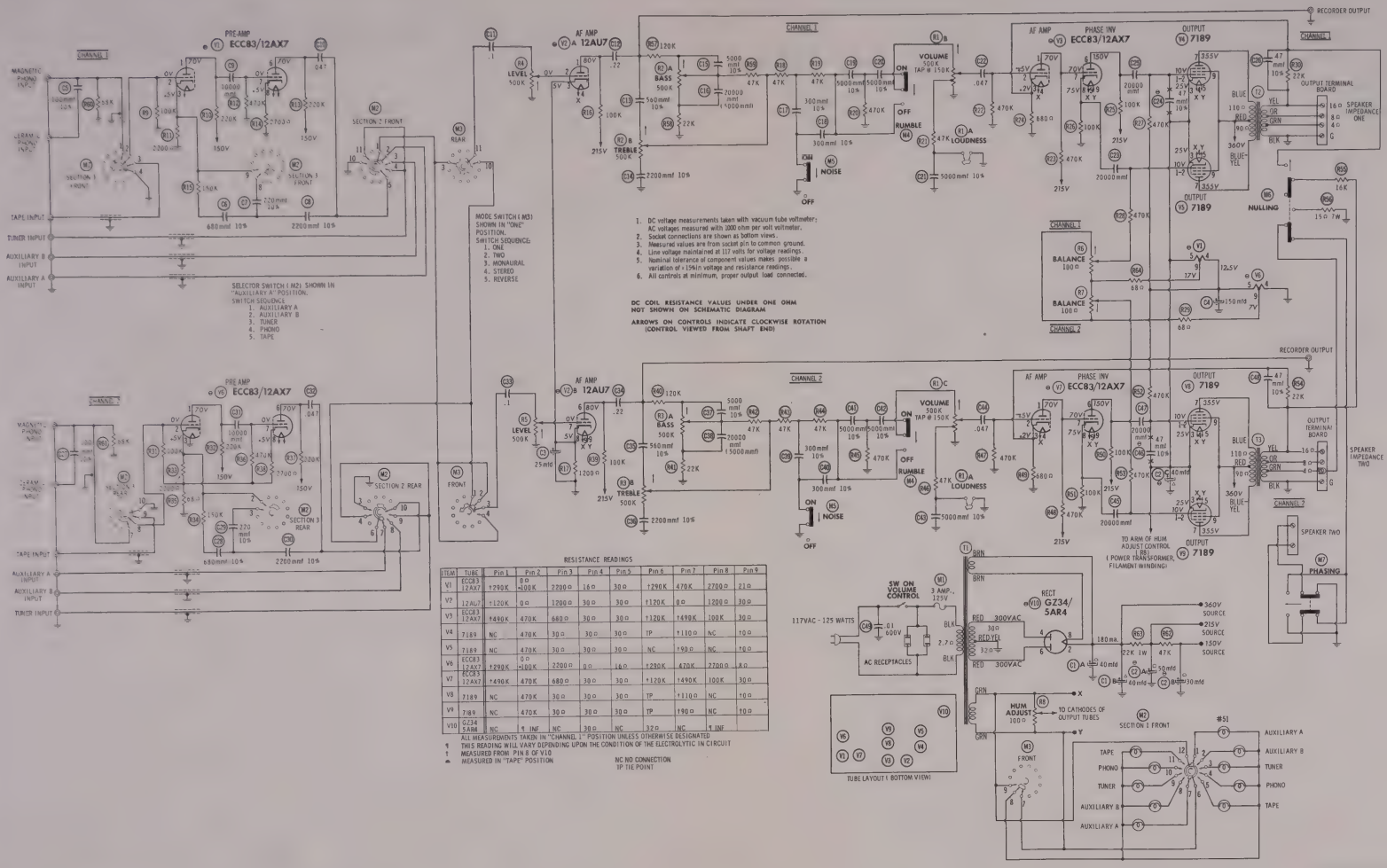
SET 533 FOLDER 6

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1961 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION


PRE-AMP
V1 ECC83/12AX7
CHANNEL 1
MAGNETIC PHONO INPUT
CERAM PHONO INPUT
TAPE INPUT
TUNER INPUT
AUXILIARY B INPUT
AUXILIARY A INPUT
SECTION 1 REAR
SECTION 2 FRONT
SECTION 1 FRONT
SECTION 2 REAR
SECTION 3 FRONT
SECTION 3 REAR
680mmf 10%
2200mmf 10%
M3 REAR
M3 FRONT
MODE SWITCH (M3) SHOWN IN "ONE" POSITION.
SWITCH SEQUENCE:
1. ONE
2. TWO
3. MONAURAL
4. STEREO
5. REVERSE
SELECTOR SWITCH (M2) SHOWN IN "AUXILIARY A" POSITION.
SWITCH SEQUENCE:
1. AUXILIARY A
2. AUXILIARY B
3. TUNER
4. PHONO
5. TAPE
AF AMP
V2 A 12AU7
LEVEL 500K
BASS 500K
TREBLE 500K
CHANNEL 1
VOLUME 500K TAP @ 150K
RUMBLE
LOUDNESS
NOISE
OFF
AF AMP
V3 PHASE INV ECC83/12AX7
OUTPUT V4 7189
OUTPUT V5 7189
RECORDER OUTPUT
CHANNEL 1
OUTPUT TERMINAL BOARD
SPEAKER IMPEDANCE ONE
NULLING
BALANCE 100Ω
CHANNEL 2
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
RESISTANCE READINGS
ITEM TUBE Pin 1 Pin 2 Pin 3 Pin 4 Pin 5 Pin 6 Pin 7 Pin 8 Pin 9
V1 ECC83 12AX7 ↑290K 0Ω ↓100K 2200Ω 16Ω 3Ω ↑290K 470K 2700Ω 21Ω
V2 12AU7 ↑120K 0Ω 1200Ω 3Ω 3Ω ↑120K 0Ω 1200Ω 3Ω
V3 ECC83 12AX7 ↑490K 470K 680Ω 3Ω 3Ω ↑120K ↑490K 100K 3Ω
V4 7189 NC 470K 3Ω 3Ω 3Ω TP ↑110Ω NC ↑0Ω
V5 7189 NC 470K 3Ω 3Ω 3Ω NC ↑9Ω NC ↑0Ω
V6 ECC83 12AX7 ↑290K 0Ω ↓100K 2200Ω 0Ω 1Ω 290K 470K 2700Ω 1Ω
V7 ECC83 12AX7 ↑490K 470K 680Ω 3Ω 3Ω ↑120K ↑490K 100K 3Ω
V8 7189 NC 470K 3Ω 3Ω 3Ω TP ↑110Ω NC ↑0Ω
V9 7189 NC 470K 3Ω 3Ω 3Ω TP ↑9Ω NC ↑0Ω
V10 GZ34 5AR4 NC ¶ INF NC 3Ω NC 32Ω NC ¶ INF
ALL MEASUREMENTS TAKEN IN "CHANNEL 1" POSITION UNLESS OTHERWISE DESIGNATED
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN CIRCUIT
↑ MEASURED FROM PIN 8 OF V10
▲ MEASURED IN "TAPE" POSITION
NC NO CONNECTION
TP TIE POINT
CHANNEL 2
SW ON VOLUME CONTROL
3 AMP., 125V
117VAC - 125 WATTS
AC RECEPTACLES
RECT V10 GZ34/5AR4
300VAC
180 ma
360V SOURCE
215V SOURCE
150V SOURCE
HUM ADJUST 100Ω
TO CATHODES OF OUTPUT TUBES
TO ARM OF HUM ADJUST CONTROL R81 (POWER TRANSFORMER, FILAMENT WINDING)
TUBE LAYOUT (BOTTOM VIEW)
#51
TAPE
PHONO
TUNER
AUXILIARY B
AUXILIARY A
SPEAKER TWO
PHASING

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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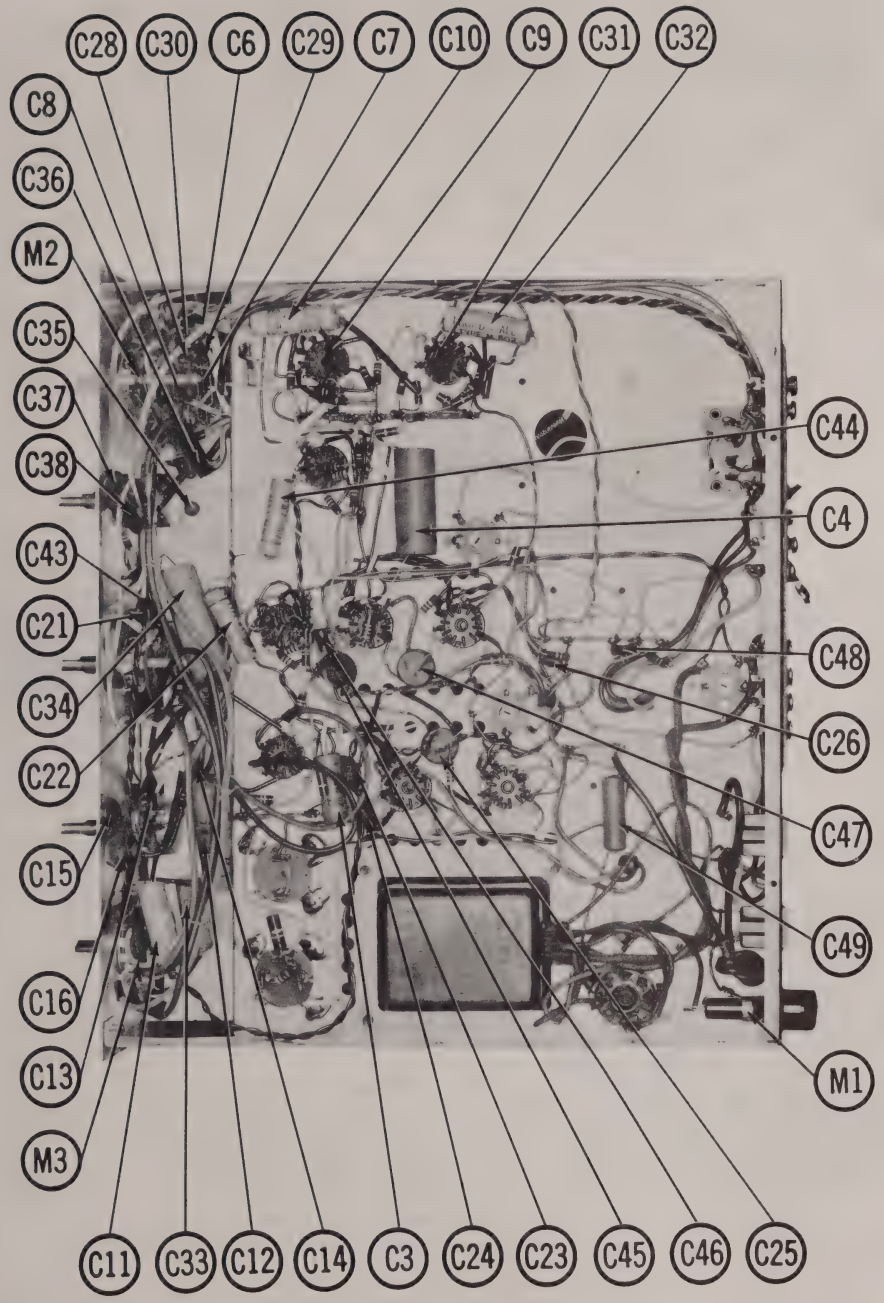
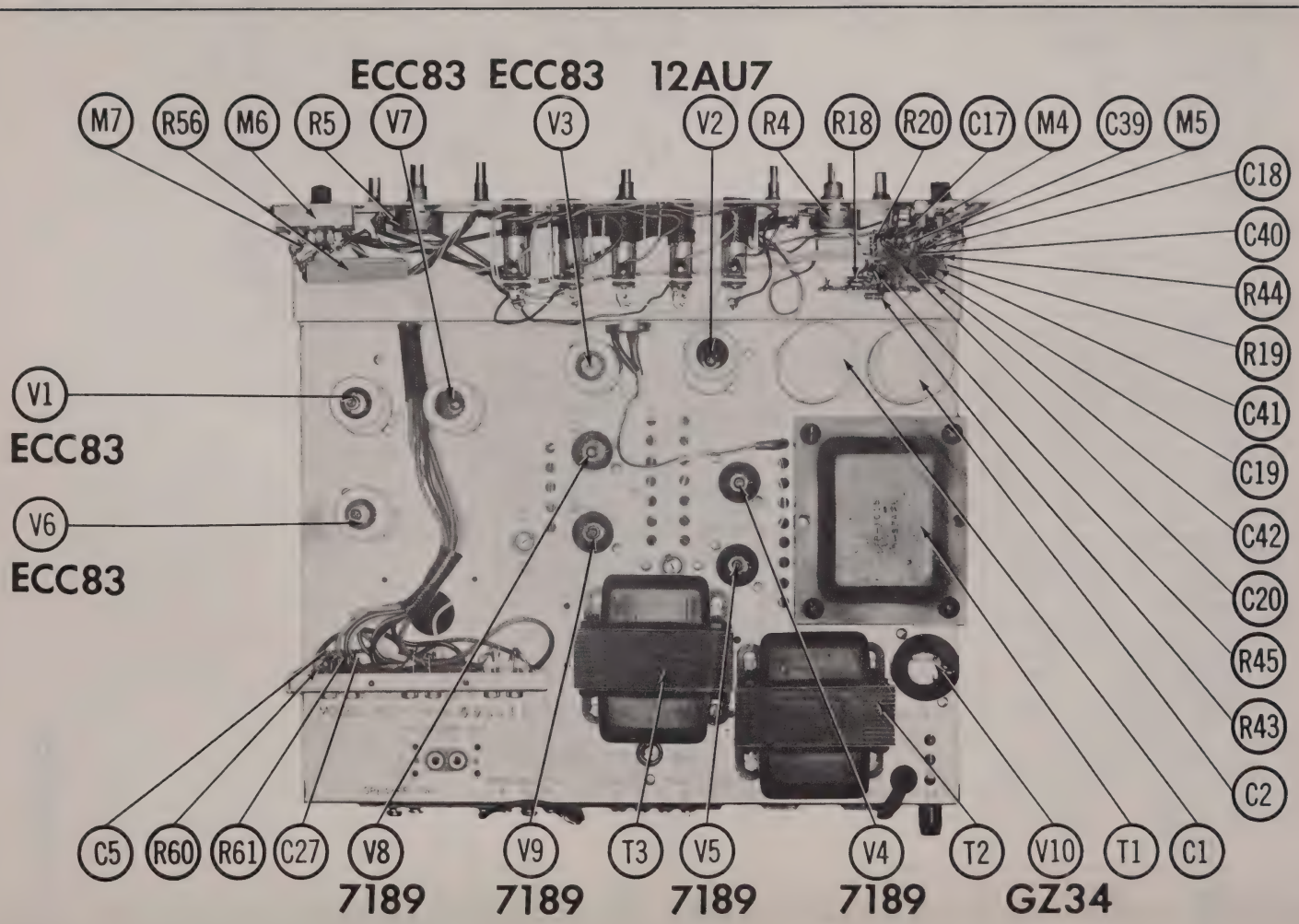
MADISON FIELDING
MODEL SERIES 360



CHASSIS BOTTOM VIEW-CAPACITOR & MISC. IDENT.



CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆)
V1	Channel 1 Preamp.	ECC83/12AX7 (7025) *
V2	Channel 1 AF Amp. - Channel 2 AF Amp.	12AU7 (12AU7A)*
V3	Channel 1 AF Amp. - Phase Inverter	ECC83/12AX7 (7025) *
V4	Channel 1 Output	7189
V5	Channel 1 Output	7189
V6	Channel 2 Preamp.	ECC83/12AX7 (7025) *
V7	Channel 2 AF Amp. - Phase Inverter	ECC83/12AX7 (7025) *
V8	Channel 2 Output	7189
V9	Channel 2 Output	7189
V10	Rectifier	GZ34/5AR4

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	Madison Fielding PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450	CE-4020	AFH2-57	B0450	FP238	TMD-2650	TVL-2764	
B	▲40	450							
C2A	■50	400	CE-305045	AFH3-147	C1480	FP369.1	TMT-3751	TVL-3788	①
B	▲30	450							
C	▲40	50							
C3	25	6	CE-25003	SRE6V25	BBR25-6	TC26	TD-25-25	TVA-1205	
C4	150	15		PRS1370	BR1505	TC25015	TD-150-50	TVA-1311	

① In some versions, C2A is 30mfd, and C2B is 50mfd (C2 Part #CE-305040).

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	100 10%		NPO-SI 100	D6-101	L10T1	CCD-101	GP310	10TS-T10
C6	680 10%			D6-681	5R5T68	CCD-681	GP368	10TS-T68
C7	220 10%		NPO-SI 220	D6-221	L10T22	CCD-221	GP322	10TS-T22
C8	2200 10%				PM6D22	CCD-222	GP222	10TS-D22
C9	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C10	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C11	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C12	.22 400V		P488N-22		CUB4P22	4DP-2-224	GEM-4022	4TM-P22
C13	560 10%		DI-560	DD-560	5R5T56	CCD-561	GP356	10TS-T56
C14	2200 10%				PM6D22	CCD-222	GP222	10TS-D22
C15	5000 10%		DI-5000		PM6D5	CCD-502	JL-250	10TS-D50
C16	20000	(5000) †	BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C17	300 10%			D6-301	L10T3	CCD-301	GP330	10TS-T30
C18	300 10%			D6-301	L10T3	CCD-301	GP330	10TS-T30
C19	5000 10%		DI-5000		PM6D5	CCD-502	JL-250	10TS-D50
C20	5000 10%		DI-5000		PM6D5	CCD-502	JL-250	10TS-D50
C21	5000 10%		DI-5000		PM6D5	CCD-502	JL-250	10TS-D50
C22	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C23	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C24	47 10%	Note 1	NPO-SI 47	D6-470	L10Q47	CCD-470	GP447	10TS-Q47
C25	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C26	47 10%		NPO-SI 47	D6-470	L10Q47	CCD-470	GP447	10TS-Q47
C27	100 10%		NPO-SI 100	D6-101	L10T1	CCD-101	GP310	10TS-T10
C28	680 10%			D6-681	5R5T68	CCD-681	GP368	10TS-T68
C29	220 10%		NPO-SI 220	D6-221	L10T22	CCD-221	GP322	10TS-T22
C30	2200 10%				PM6D22	CCD-222	GP222	10TS-D22
C31	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C32	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C33	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C34	.22 400V		P488N-22		CUB4P22	4DP-2-224	GEM-4022	4TM-P22
C35	560 10%		DI-560	DD-560	5R5T56	CCD-561	GP356	10TS-T56
C36	2200 10%				PM6D22	CCD-222	GP222	10TS-D22
C37	5000 10%		DI-5000		PM6D5	CCD-502	JL-250	10TS-D50
C38	20000	(5000) †	BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C39	300 10%			D6-301	L10T3	CCD-301	GP330	10TS-T30
C40	300 10%			D6-301	L10T3	CCD-301	GP330	10TS-T30
C41	5000 10%		DI-5000		PM6D5	CCD-502	JL-250	10TS-D50
C42	5000 10%		DI-5000		PM6D5	CCD-502	JL-250	10TS-D50

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C43	5000 10%		DI-5000		PM6D5	CCD-502	JL-250	10TS-D50
C44	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C45	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C46	47 10%	Note 1	NPO-SI 47	D6-470	L10Q47	CCD-470	GP447	10TS-Q47
C47	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C48	47 10%		NPO-SI 47	D6-470	L10Q47	CCD-470	GP447	10TS-Q47
C49	.01 600V		P688N-01	D6-103	CUB6S1	6DP-2-103	GEM-611	6TM-S10

† Alternate Value.

Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	Madison Fielding PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	Switch		RV-5051					Loudness
B	500K							Volume, Channel 1
	150K Tap							
C	500K							Volume, Channel 2
	150K Tap							
D	Switch							
R2A	500K		RV-5053	F1-41		† QJ-1534R	■ UE4215	Bass, Channel 1
B	500K			R2-41				Treble, Channel 1
R3A	500K		RV-5053	F1-41		† QJ-1534R	■ UE4215	Bass, Channel 2
B	500K			R2-41				Treble, Channel 2
R4A	500K		RV-5054	B-59	A47-500K-S	Q11-133	U50	Level, Channel 1
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R5A	500K		RV-5054	B-59	A47-500K-S	Q11-133	U50	Level Channel 2
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R6	100Ω		RW-1011				FL-100P	Balance, Channel 1
R7	100Ω		RW-1011				FL-100P	Balance, Channel 2
R8	100Ω		RW-1011				FL-100P	Hum Adjust

† "CONCENTRIKIT" Equivalent: K-6 Kit with Base Elements and Shafts: B13-133, P13-022 (Panel)
(Not available as a factory assembled unit) B13-133, R1-100 (Rear)

■ "STA-LOC" Equivalent: FA55A, RU55A, OS687, IS1062

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	IRC PART No.	WORKMAN TV PART No.	REMARKS
R9	100K			
R10	220K			
R11	2200Ω			
R12	470K			
R13	220K			
R14	2700Ω			
R15	150K			
R16	100K			
R17	1200Ω			
R18	47K			
R19	47K			
R20	470K			
R21	47K			
R22	470K			
R23	470K			
R24	680Ω			
R25	100K			
R26	100K			
R27	470K			
R28	470K			
R29	68Ω			
R30	22K			
R31	100K			
R32	220K			
R33	2200Ω			
R34	150K			
R35	68Ω			
R36	470K			

ITEM No.	RATING	IRC PART No.	WORKMAN TV PART No.	REMARKS
R37	220K			
R38	2700Ω			
R39	100K			
R40	120K			
R41	22K			
R42	47K			
R43	47K			
R44	47K			
R45	470K			
R46	47K			
R47	470K			
R48	470K			
R49	680Ω			
R50	100K			
R51	100K			
R52	470K			
R53	470K			
R54	22K			
R55	16K			
R56	15Ω 7W	PW10-15	10W-SQ-15	
R57	120K			
R58	22K			
R59	47K			Note 1
R60	68K			Note 1
R61	68K			
R62	47K			
R63	22K 1W			
R64	68Ω			

Note 1. Not used in some versions.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
				Madison Fielding PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
	PRI.	SEC. 1	SEC. 2						
T1	117V @ 1.15A	600VCT @ .180A DC	6V @ 1.9A	TP-1015					
	SEC. 3	SEC. 4	SEC. 5						
	6.3V @ 4.7A								

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
			Madison Fielding PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
	PRI.	SEC.						
T2	7800Ω CT	16Ω Tap @ 8Ω, 4Ω	T0-1007				S-24A ①	① Drill New Mounting Hole(s).
T3	7800Ω CT	16Ω Tap @ 8Ω, 4Ω	T0-1007				S-24A ①	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Madison Fielding PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	3A 125V	FS-3000		313003 (3AG 3A 125V)	342001	MDX-3	HKP

MISCELLANEOUS

ITEM No.	PART NAME	Madison Fielding PART No.	NOTES
M2	Switch	SF-1022	Selector, Rotary Type
M3	Switch	SF-1023	Mode, Rotary Type
M4	Switch		Rumble (DPDT Slide Type)
M5	Switch		Noise (DPDT Slide Type)
M6	Switch		Nulling (DPDT Slide Type) Spring Return
M7	Switch		Phase (DPDT Slide Type)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

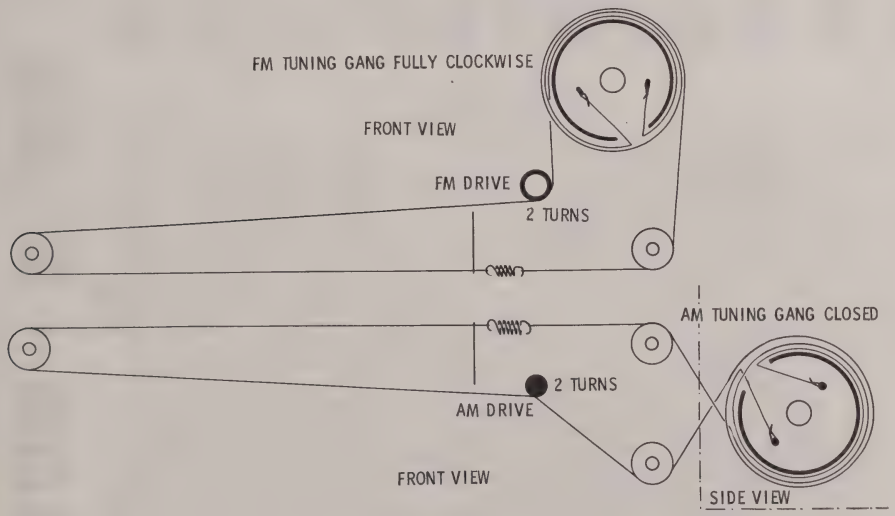
PHOTOFACT® Folder with CIRCUITRACE®

NORDMENDE MODEL
Norma III (U208)

NORDMENDE MODEL
Norma III (U208)

TRADE NAME	Nordmende Model Norma III (U208)		
IMPORTER	Sterling Hi-Fidelity, Inc., 22-14 40th Ave., Long Island City 1, N. Y.		
TYPE SET	AC Operated 5 Tube FM-BC-SW Receiver		
POWER SUPPLY	110 — 120 Volts AC, 60 Cycles	RATING	38 Watts, .36 Amp. @117 Volts AC (FM)
TUNING RANGE—BROADCAST	515 - 1650KC	SHORT WAVE	5.9 — 18MC FREQ. MOD. 88 — 108MC

DIAL CORD STRINGING



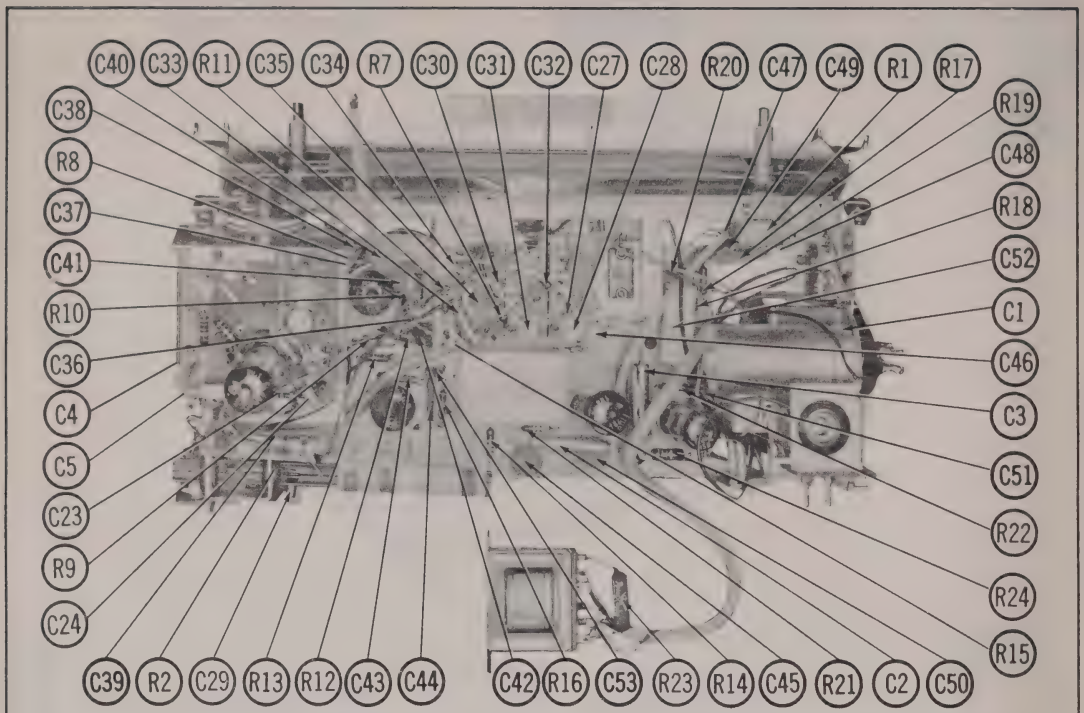
NORDMENDE MODEL
Norma III (U208)

SET 533 FOLDER 7

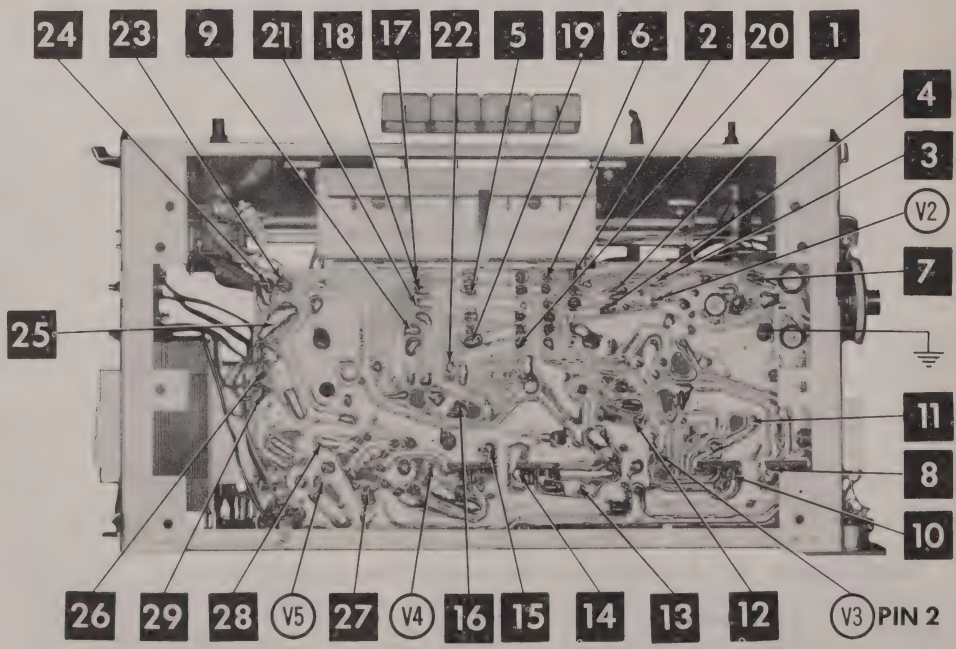
HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1961 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

KK361



CHASSIS TOP VIEW—CAPACITOR AND RESISTOR IDENTIFICATION



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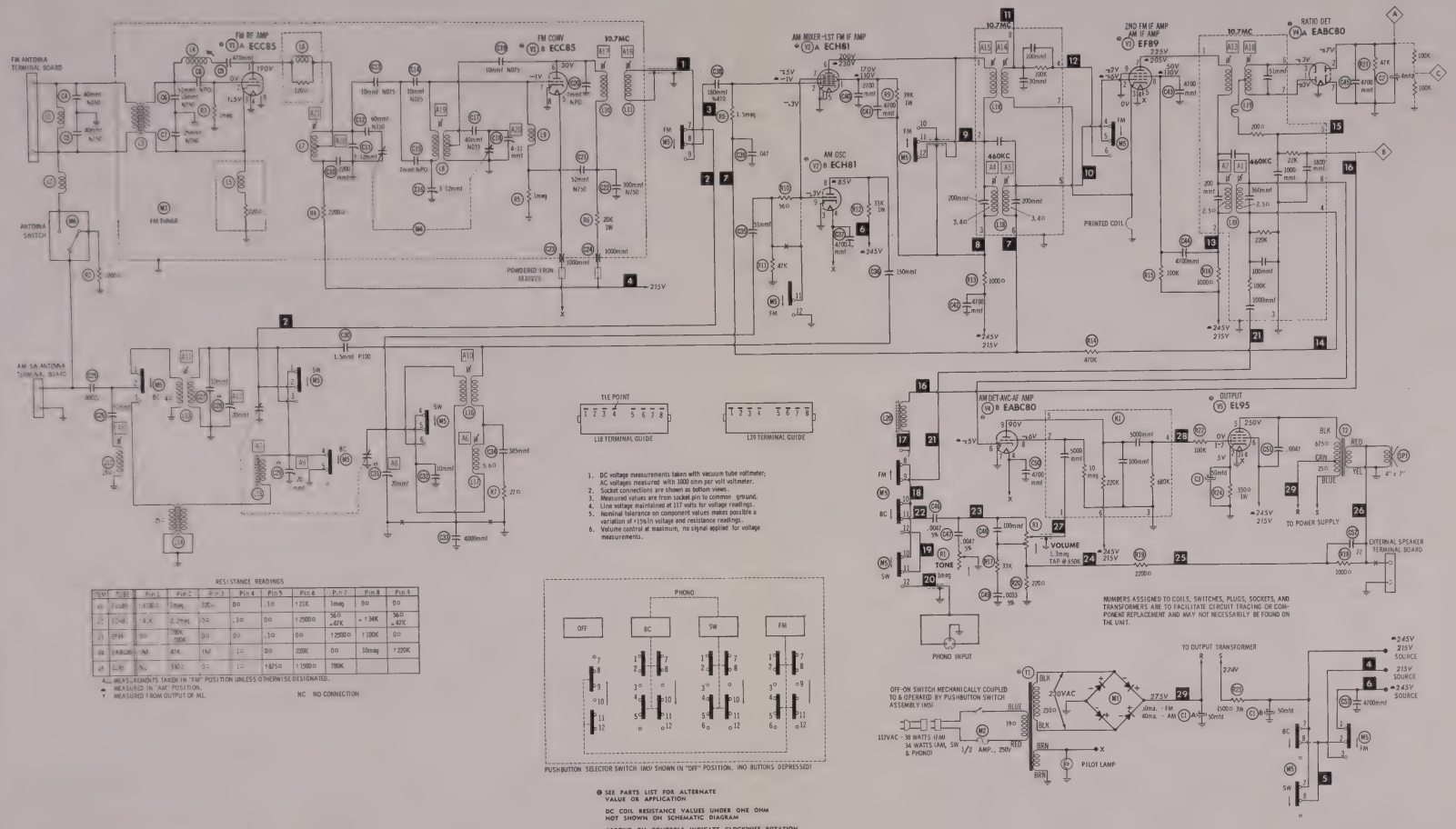
PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



RESISTANCE READINGS

TUBE	TYPE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC85	1100Ω	1.5meg	220Ω	0Ω	.1Ω	1meg	0Ω	0Ω	0Ω
V2	ECH81	4.7K	2.7meg	0Ω	.1Ω	0Ω	1250Ω	360Ω ± 47K	∞ 1.3M	360Ω ± 47K
V3	EF89	3Ω	560K 100K	0Ω	0Ω	.1Ω	0Ω	1250Ω	1100K	0Ω
V4	EABC80	1MΩ	47K	1MΩ	1Ω	0Ω	220K	0Ω	10meg	1250K
V5	EL95	1MΩ	330Ω	0Ω	1Ω	1675Ω	1500Ω	780K		

A.C. MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
▲ MEASURED IN "AM" POSITION.
† MEASURED FROM OUTPUT OF MIL.
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC
— On CIRCUITRACE

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NORDMENDE MODEL Norma III (U208)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
A1 Thru A4, A6, A10
A11, A13, A14, A15, A18...GENERAL CEMENT #8282, 8606, 8606-L, 9091
WALSCO #2526, 2541, 2542, 2543, 2544
A8, A9, A12, A20, A22...GENERAL CEMENT #5004, 5009, 8195, 8274, 8275, 8607, 8728, 8987, 8988, 8989, 9291
WALSCO #2515, 2520, 2522, 2523, 2531, 2532, 2534, 2537, 2538
A16, A17, A19, A21.....GENERAL CEMENT #9440

AM ALIGNMENT — SELECTOR IN BC POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru 200mmf and 400Ω in series to pin 2 (grid) of AM Mixer. Low side to chassis.	460KC (400∿ Mod.)	(BC) Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	High side thru 200mmf and 400Ω in series to external AM antenna terminal.	"	"	"	A5	Adjust for MINIMUM output.
3.	"	515KC	Tuning gang fully closed.	"	A6, A7	Adjust for maximum output.
4.	"	1480KC	1480KC	"	A8, A9	"
5.	"	6.1MC	(SW) 6.1MC	"	A10, A11	"
6.	"	17.9MC	17.9MC	"	A12	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM—SELECTOR IN FM POSITION

Connect two matched 100K (±1%) resistors in series from point Ⓐ to chassis. The junction of these two resistors is alignment point Ⓒ as shown on the schematic.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	Place a thin insulated metal strip between the RF Amp. tube and the tube shield. Connect the high side of generator to the metal strip. Low side to chassis.	10.7MC (Unmod.)	(FM) Point of non-interference.	DC probe to point Ⓐ. Common to chassis.	A13, A14, A15, A16, A17	Adjust for maximum deflection.
8.	"	"	"	DC probe to point Ⓑ. Common to point Ⓒ.	A18	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE—SELECTOR IN FM POSITION

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
7.	Place a thin insulated metal strip between the FM RF Amp. tube and the tube shield. Connect the high side of generator to the metal strip. Low side to chassis.	10.7MC (450KC Swp)	(FM) Point of non-interference.	Vert. amp. to point Ⓐ. Low side to chassis.	A13, A14, A15, A16, A17	Disconnect stabilizing Capacitor C2. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C2.
8.	"	"	"	Vert. amp. to point Ⓑ. Low side to chassis.	A18	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A13 for maximum amplitude and straightness of cross-over lines.

FM RF ALIGNMENT—SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9.	Across FM antenna terminals.	88MC	(FM) 88MC	DC probe to point Ⓐ. Common to chassis.	A19	Adjust for maximum deflection.
10.	"	108MC	108MC	"	A20	Adjust for maximum deflection. Repeat Steps 9 and 10.
11.	"	90MC	90MC	"	A21	Adjust for maximum deflection.
12.	"	106MC	106MC	"	A22	"

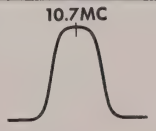


FIG. 1

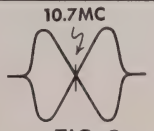
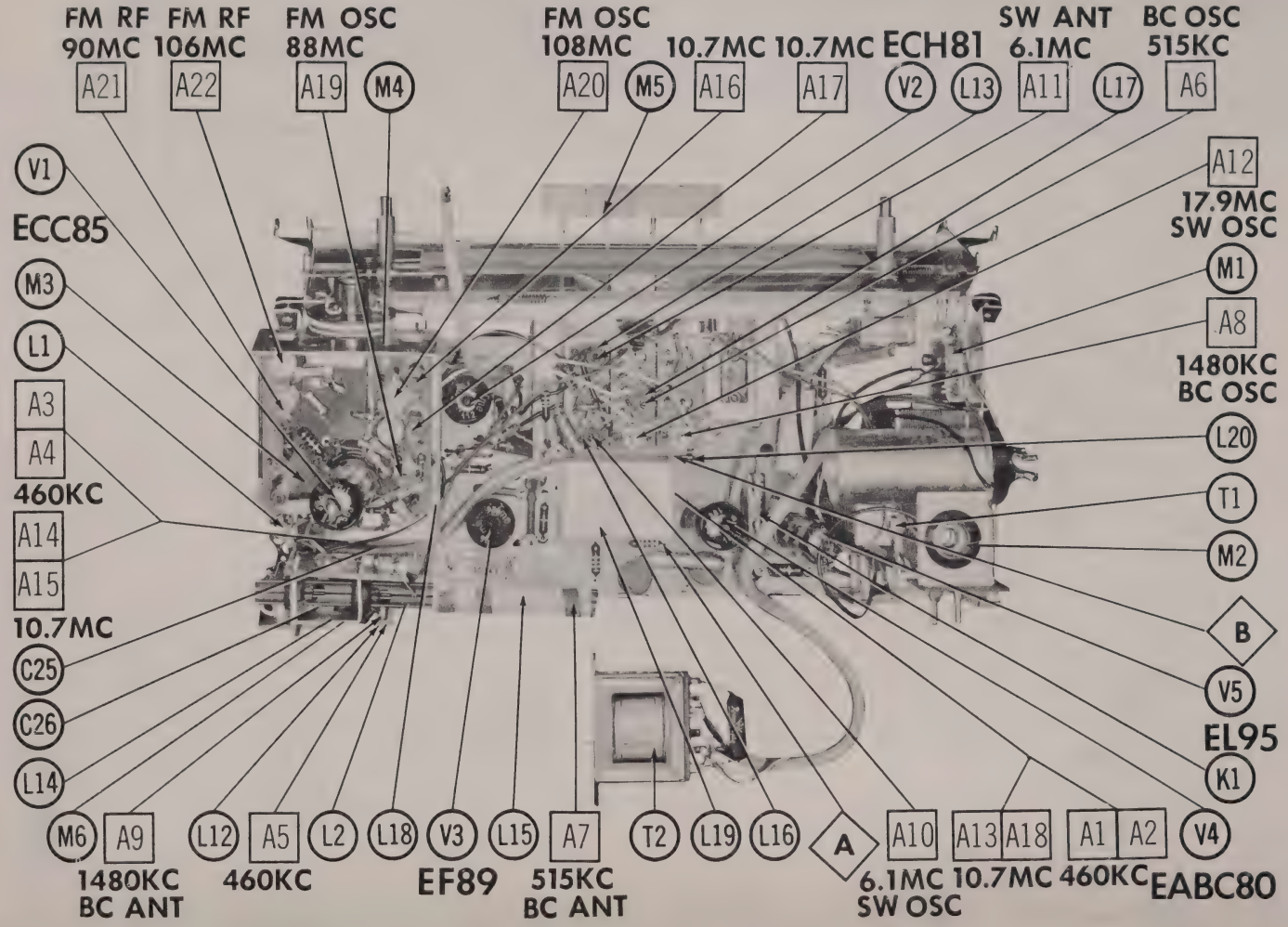


FIG. 2



CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE
V1	FM RF Amp. -FM Conv.	ECC85 (6AQ8) *
V2	FM IF Amp. -AM Mixer-AM Osc.	ECH81 (6AJ8) *
V3	2nd FM - 1st AM IF Amp.	EF89 (6DA6) *
V4	Ratio Det. -AM Det. - AVC	EABC80 (6T8, 6AK8) *
V5	Output	EL95 (6DL5) *

* Alternate

ELECTROLYTIC CAPACITORS

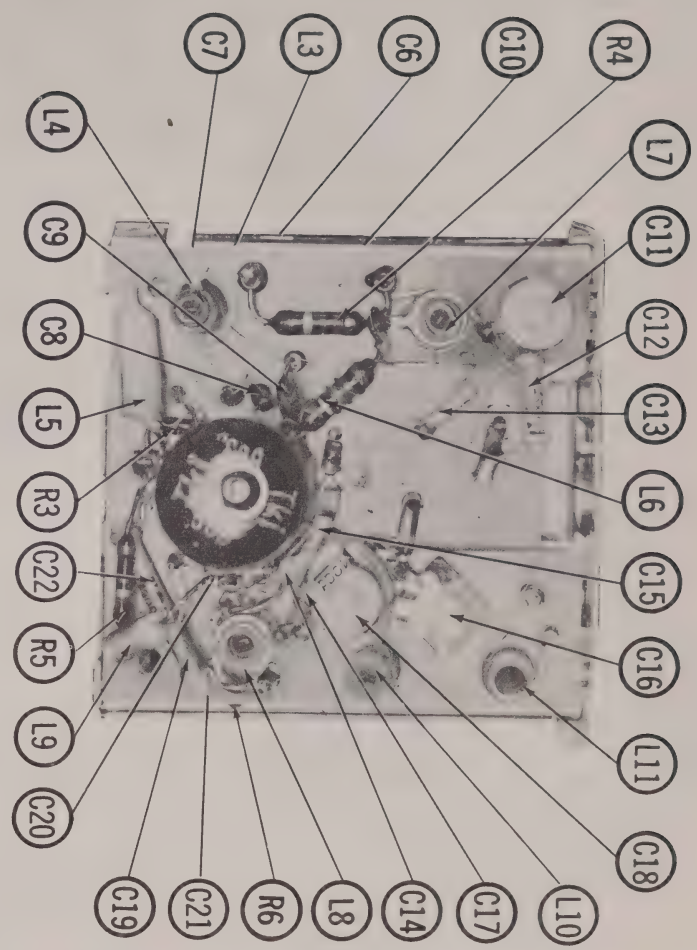
ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	NORDMENDE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	50	350	443.018.14						
B	50	350							
C2	4	70	443.062.15	PRS1400	NLW4-150	TT80X4	MLV5-100	TE-1403	
C3	50	12	443.053.15	PTT-12050	NLW50-15	TT15X50	MLV50-12	TE-1133	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C4	40 N750		N750-SI 39	TCN-39	C10Q39U	CCTN-390	CN7-439	10TCU-Q39
C5	40 N750		N750-SI 39	TCN-39	C10Q39U	CCTN-390	CN7-439	10TCU-Q39
C6	15 N750		N750-SI 15	TCN-15	C10Q15U	CCTN-150	CN7-415	10TCU-Q15
C7	25 N750		N750-SI 25	TCN-25	C10Q25U	CCTN-250	CN7-425	10TCU-Q25
C8	51 NPO		NPO-SI 51	TCZ-51	C10Q51C	CCTO-510	CNO-450	10TCC-Q50
C9	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C10	2200		SI 2200	D6-222	BYA10D22	CCD-222	B-222	5HK-D22
C11	3-12	#447.000.15				*		
C12	60 N150					*		
C13	10 N075					*		
C14	10 N075							
C15	7 NPO		NPO-SI 6.8	TCZ-6R8	C10V68C	CCTO-6R8	CNO-568	10TCC-V68
C16	3-12	#447.000.15						
C17	40 N033					*		
C18	4-11	#447.001.15						
C19	10 N075					*		
C20	7 NPO		NPO-SI 6.8	TCZ-6R8	C10V68C	CCTO-6R8	CNO-568	10TCC-V68
C21	52 N750		N750-SI 51	TCN-51	C10Q51U			
C22	300 N750		N750-SI 300	TCN-300	C10T3U	CCTN-301		
C23	1000		EF-001	MFT-1000		CCF-102	CT280A	
C24	1000		EF-001	MFT-1000		CCF-102	CT280A	
C25	.00022 500V		P688N-00025	DD-221	CUB6T25	CCD-221	B-322	6TM-T25
C26	51		NPO-SI 51	TCZ-51	C10Q51C	CCTO-510	CNO-450	10TCC-Q50
C27	10		NPO-SI 10	TCZ-10	C10Q10C	CCTO-100	CNO-410	10TCC-Q10
C28	20	Note 1						
C29	20	Note 1						
C30	1.5 P100					*		
C31	20	Note 1						
C32	10		NPO-SI 10	TCZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C33	4000		SI 4000	D6-402	BYA10D4	CCD-392	B-240	5HK-D40
C34	385		SI 390	D6-390	LI0T39	CCD-391	B-339	10TS-T39
C35	51		NPO-SI 51	TCZ-15	C10Q51C	CCTO-510	CNO-450	10TCC-Q50
C36	150		SI 150	D6-151	LI0T15	CCD-151	B-315	10TS-T15
C37	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C38	180 N470					*		
C39	.047 250V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C40	2700		SI 2700	D6-272	BYA10D27	CCD-272	B-227	10TS-D27
C41	4700		SI 4700	D6-472	BYA10D47M	CCD-472	B-247	5HK-D47
C42	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C43	4700		SI 4700	D6-472	BYA10D47M	CCD-472	B-247	5HK-D47
C44	4700		SI 4700	D6-472	BYA10D47M	CCD-472	B-247	5HK-D47
C45	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C46	.0047 250V 5%		V84C4D47-5%		1R5D47	CM-20B-472J	MCJ464	MS-247
C47	.0047 250V 5%		V84C4D47-5%		1R5D47	CM-20B-472J	MCJ464	MS-247
C48	100		SI 100	D6-101	LI0T1	CCD-101	GP310	10TS-T10

FM RF SUBCHASSIS



NORDMENDE MODEL
Norma III (U208)

PARTS LIST AND DESCRIPTIONS (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C49	.0033 250V 5%		V84CD33-5%		1R5D33	CM-20B-332J	MCJ462	MS-233
C50	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C51	.0047 500V		P688N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C52	.22 250V		P488N-22		CUB4P22	4DP-5-224	GEM-4022	4TM-P22
C53	4700		SI 4700	D6-472	BYA10D47M	CCD-472	B-247	5HK-D47

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
Note 1. Nominal Value (Part #447.030.15).
Nordmende Part Number.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	NORDMENDE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A B	1meg 1.3meg 650K Tap		402.180.14					Tone Volume

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R2	1000Ω				R14	470K			
R3	1meg				R15	100K			
R4	2200Ω				R16	1000Ω			
R5	1meg				R17	33K			
R6	20K 1W				R18	1000Ω			
R7	27Ω				R19	2200Ω			
R8	1.5meg				R20	220Ω			
R9	39K 1W				R21	47K			
R10	56Ω				R22	100K			
R11	47K				R23	1500Ω 3W			
R12	33K 1W				R24	330Ω 1W			
R13	1000Ω								

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		NORDMENDE PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	
L1	FM Ant.					① Includes 220Ω Resistor
L2	RF Choke					② Wound on 120Ω Resistor
L3	FM Ant.					
L4	Trap					
L5	Cathode Choke	①				
L6	RF Choke	②				
L7	FM RF	423.106.24				
L8	FM Osc.	423.107.24				
L9	RF Choke					
L10	1st FM IF Prim					
L11	1st FM IF Sec.					
L12	IF Trap					
L13	SW Ant.	423.277.25				
L14	BC Ant.	423.007.25				
L15	Loopstick	423.017.25				
L16	SW Osc.	423.278.25				
L17	BC Osc.	423.234.25				
L18A B	2nd FM IF 1st AM IF	520.132.24				
L19A B	Ratio Detector 2nd AM IF	520.025.24				
L20	RF Choke					

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	NORDMENDE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	117V Ⓐ .36A	230V Ⓐ .050A DC	6.3V Ⓐ 2.3A AC	521.027.13 ①					① Alternate Part # 521.024.23

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	NORDMENDE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	10K Tap Ⓐ 3.5%	3-4Ω	522.011.13					

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	NORDMENDE PART No.	QUAM PART No.	
SP1	4"x 7"	PM	3-4Ω	470.010.14		

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	NORDMENDE PART No.	REPLACEMENT DATA
K1	Audio Coupling	100mmf, 5000mmf, 5000mmf, 22K, 680K, 10meg	B860019/01	

POWER RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	NORDMENDE PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.050A	*				* Bridge (Selenium)

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			NORDMENDE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2		¼A 250V	467.019.19					

MISCELLANEOUS

ITEM No.	PART NAME	NORDMENDE PART No.	NOTES
M3	Tuner	446.023.14	FM Complete (Includes 2 Gang Tuning Cap, Part#446.000.14)
M4	Tuning Cap.		AM (2 Gang)
M5	Switch	478.054.12	Pushbutton Type (Includes Off-BC-SW-and FM)
M6	Switch		Ant. (2 Position)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT® Folder

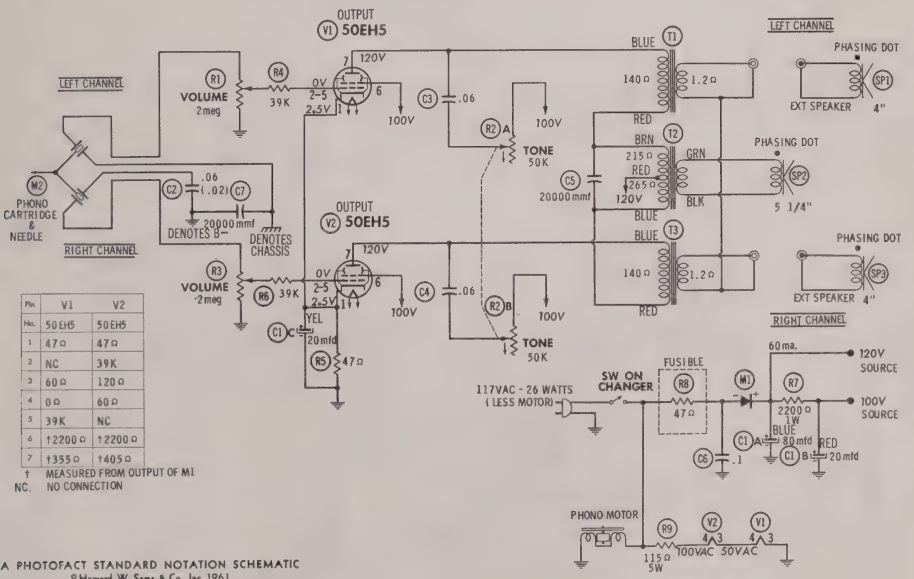
**PHONOLA
MODEL 1460**

PHONOLA
MODEL 1460

TRADE NAME	Phonola Model 1460
MANUFACTURER	Waters Conley Co., Rochester, Minnesota
TYPE SET	AC Operated 2 Tube Stereo Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	105 - 125 Volts AC, 60 Cycles RATING 26 Watts, .28 Amp. @117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER PART #14551 — SEE V-M1201 — PHOTOFACT SET 436 FOLDER 18 OR RECORD CHANGER MANUAL RC-12

PHONOLA
MODEL 1460



Pin	V1	V2
No.	50EH5	50EH5
1	47Ω	47Ω
2	NC	39K
3	60Ω	120Ω
4	0Ω	60Ω
5	39K	NC
6	†2200Ω	†2200Ω
7	†355Ω	†405Ω

† MEASURED FROM OUTPUT OF M1
NC. NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PARTS LIST AND DESCRIPTIONS

TUBES

◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Left Channel Output	50EH5	V2	Right Channel Output	50EH5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA PHONOLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	80	150	12145	PRS4650	BBRT8415C	TCT3117	TDLT-7	TVA-3455	
B	20	150							
C	20	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	.06 200V	(.02) †	P288N-06		CUB6S6	6DP-3-603	GEM-416	6TM-S60
C3	.06 200V		P288N-06		CUB6S6	6DP-3-603	GEM-416	6TM-S60
C4	.06 200V		P288N-06		CUB6S6	6DP-3-603	GEM-416	6TM-S60
C5	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C6	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C7	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-250	5HK-S20

† Alternate Value.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA PHONOLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg	1/2	12400	B-76				Volume, Left Channel
B	Bushing			AK-31				
R2A	50K	1/2	13650	B-32			FB54A	Tone, Left Channel
B	50K	1/2		SR-32			RU54A	Tone, Right Channel
C	Shaft			Not Req.			CS3500	
R3A	2meg	1/2	12400	B-76				Volume, Right Channel
B	Bushing			AK-31				

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R4	39K			
R5	47Ω			
R6	39K			

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R7	2200Ω 1W			
R8	47Ω			
R9	115Ω 5W	PW5-115	5W-SQ-115	

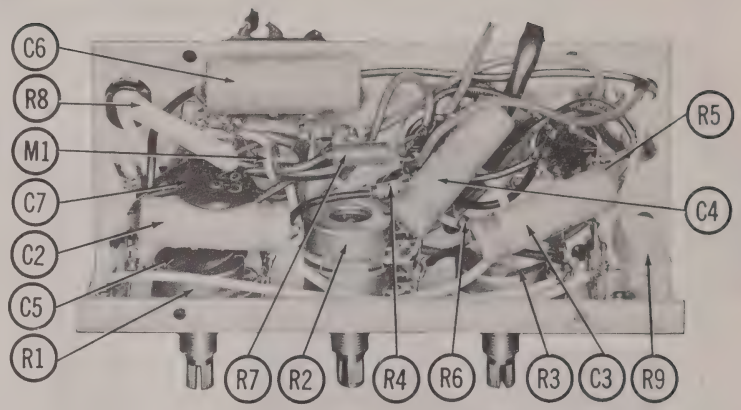
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA PHONOLA PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	3100Ω	3-4Ω	13649	A-3025	A-3332	24S53	S-12X	
T2	3100Ω	3-4Ω	13649	A-3025	A-3332	24S53	S-12X	
T3	3200Ω CT	3-4Ω	14483	A-2900	A-3856	24S04	S-62X	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA PHONOLA PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	11792	4A07	
SP2	5 1/4"	PM	3-4Ω	14450	52A1	
SP3	4"	PM	3-4Ω	11792	4A07	

CHASSIS—BOTTOM VIEW



POWER RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA PHONOLA PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.060A	13782	1N1763	2F4	SR200	Silicon

PHONO CARTRIDGE & NEEDLES

*NEEDLE LISTINGS SHOWN ARE FOR RESPECTIVE REPLACEMENT CARTRIDGES ONLY.

ITEM No.	REPLACEMENT DATA PHONOLA PART No. CARTRIDGE	PHONOLA PART No. NEEDLE*	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE*	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE*	SONOTONE PART No. CARTRIDGE	SONOTONE PART No. NEEDLE*	NOTES
M2	WC14665 †	WC14122 * (LP)	70TS	N8-7 * (LP)	46T	Not Req.	12TH-S	Not Req.	† Includes Needles
		WC12282 * (78)		N8-3 * (78)					

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	12126-9E	
Cabinet	14616	
Handle	13448-5B	

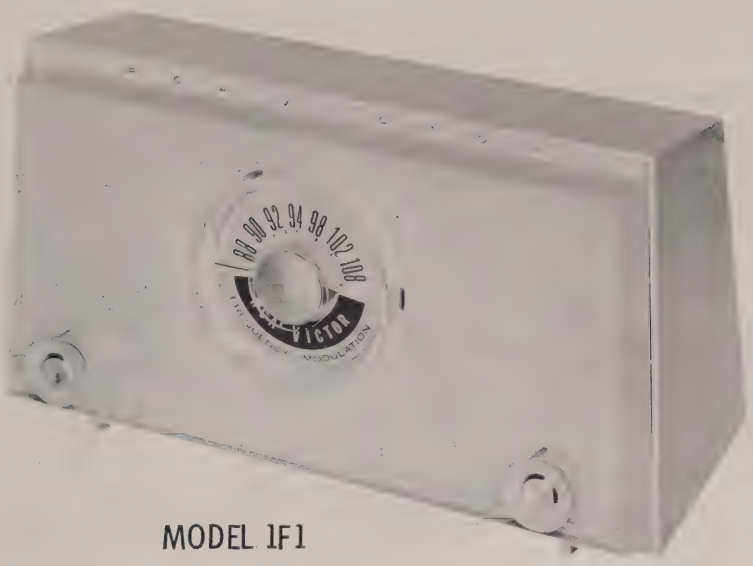
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting) ..... Use BELDEN No. 8401
Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

PHOTOFACT® Folder

RCA VICTOR MODELS 1F1, 1F2D, 1F2E (Ch. RC-1201A)

RCA VICTOR MODELS 1F1, 1F2D, 1F2E (Ch. RC-1201A)

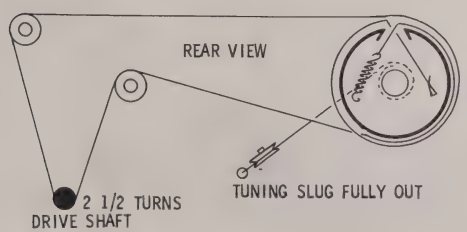


MODEL 1F1

RCA VICTOR MODELS 1F1, 1F2D, 1F2E (Ch. RC-1201A)

TRADE NAME	RCA Victor Models 1-F-1, 1-F-2D, 1-F-2E (Ch. RC-1201A)
MANUFACTURER	RCA Victor Radio & "Victrola" Div., Radio Corp. of America, Camden 8, N. J.
TYPE SET	AC-DC Operated 5 Tube FM Receiver
POWER SUPPLY	110 - 120 Volts AC-DC
TUNING RANGE FREQ. MOD.	88 — 108MC RATING 30 Watts, .31 Amp. @ 117 Volts AC

DIAL CORD STRINGING



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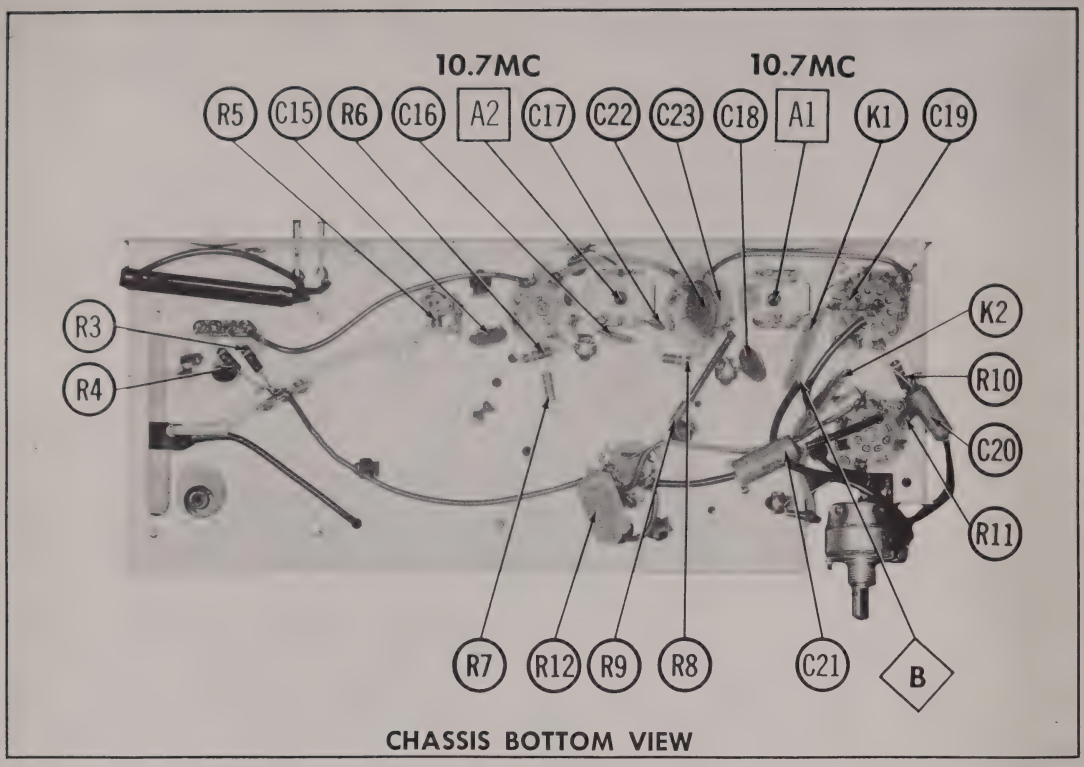
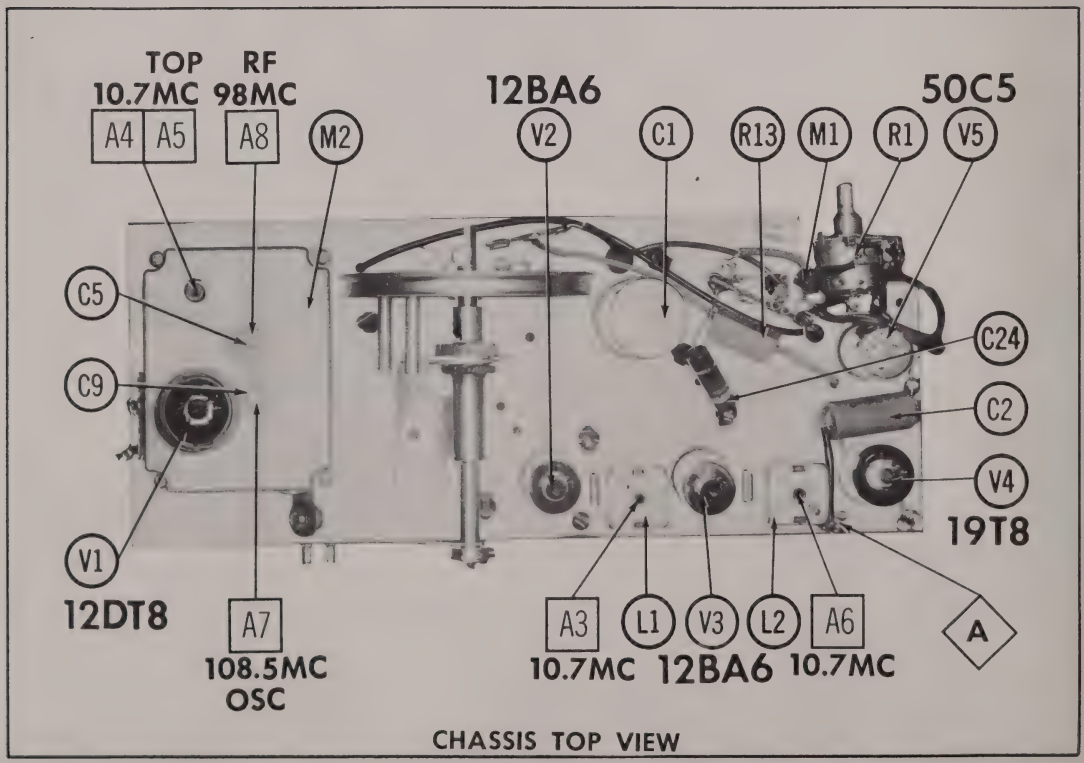
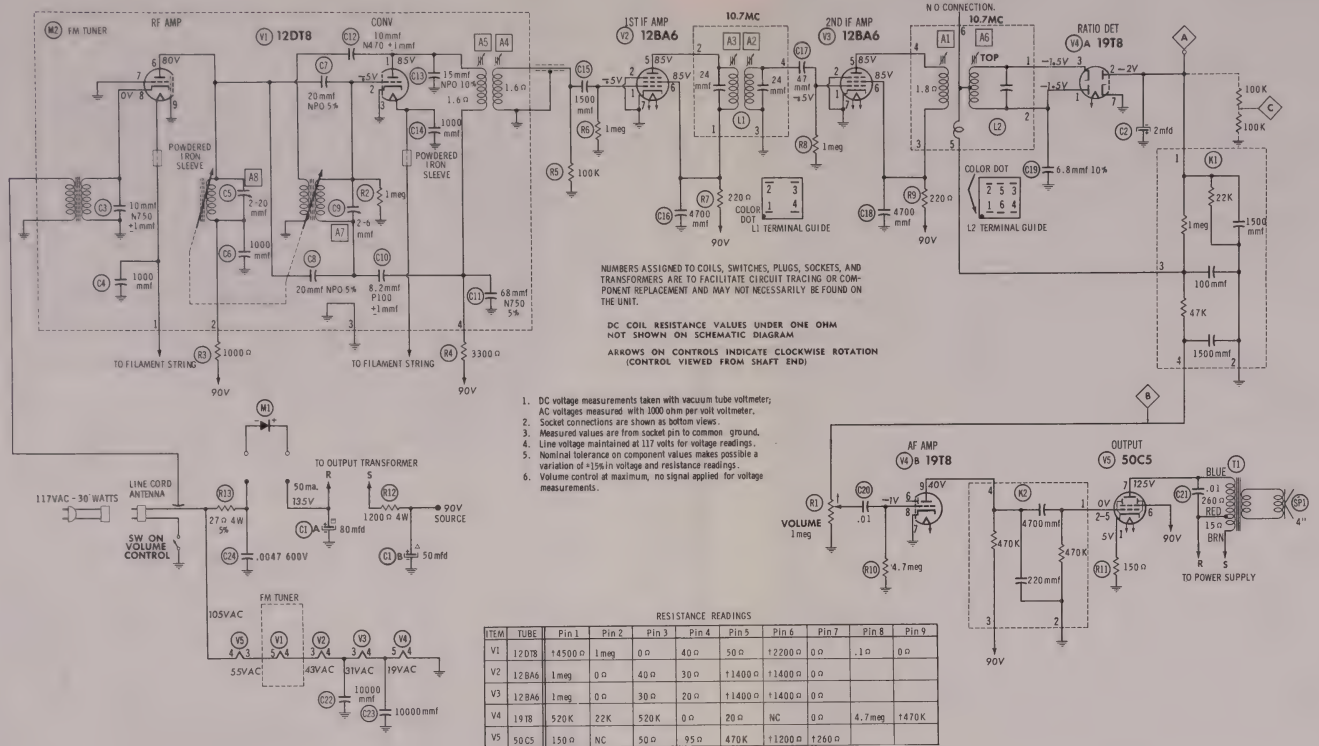


CHASSIS BOTTOM VIEW



CHASSIS TOP VIEW



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12DT8	†4500Ω	1meg	0Ω	40Ω	50Ω	†2200Ω	0Ω	.1Ω	0Ω
V2	12BA6	1meg	0Ω	40Ω	30Ω	†1400Ω	†1400Ω	0Ω		
V3	12BA6	1meg	0Ω	30Ω	20Ω	†1400Ω	†1400Ω	0Ω		
V4	19T8	520K	22K	520K	0Ω	20Ω	NC	0Ω	4.7meg	†470K
V5	50C5	150Ω	NC	50Ω	95Ω	470K	†1200Ω	†260Ω		

† MEASURED FROM OUTPUT OF M1
NC NO CONNECTION

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
A1, A2, A3, A6.... GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545
A4, A5..... GENERAL CEMENT #9440
A7, A8..... GENERAL CEMENT #5004, 5009, 8195, 8274, 8275, 8607, 8728, 8987, 8988, 8989, 9291
WALSCO #2515, 2520, 2522, 2523, 2531, 2532, 2534, 2537, 2538

IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100K (±5%) resistors in series from point (A) to chassis. The junction of these two resistors is alignment point (C) as shown on the schematic.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	Across antenna terminals.	10.7MC (Unmod.)	Point of non-interference.	DC probe to point (A). Common to chassis.	A1, A2, A3, A4, A5	Adjust for maximum deflection.
2.	"	"	"	DC probe to point (B). Common to point (C).	A6	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1.	Across antenna terminals.	10.7MC (450KC Swp)	Point of non-interference.	Vert. amp. to point (A). Low side to chassis.	A1, A2, A3, A4, A5	Disconnect stabilizing Capacitor C2. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C2.
2.	"	"	"	Vert. amp. to point (B). Low side to chassis.	A6	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A1 for maximum amplitude and straightness of cross-over lines.

RF ALIGNMENT

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
3.	Across antenna terminals with 270Ω in high side.	108.5MC (Unmod.)	High end stop.	DC probe to point (A). Common to chassis.	Tuner String Drive Collar.	Adjust for maximum output.
4.	"	87.5MC	Low end stop.	"	A7	"
5.	"	98MC	98MC Signal.	"	A8	Adjust for maximum deflection. Repeat Steps 3, 4 and 5.

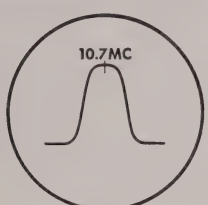


FIG. 1

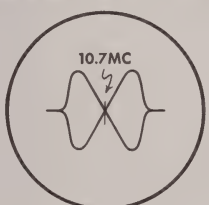
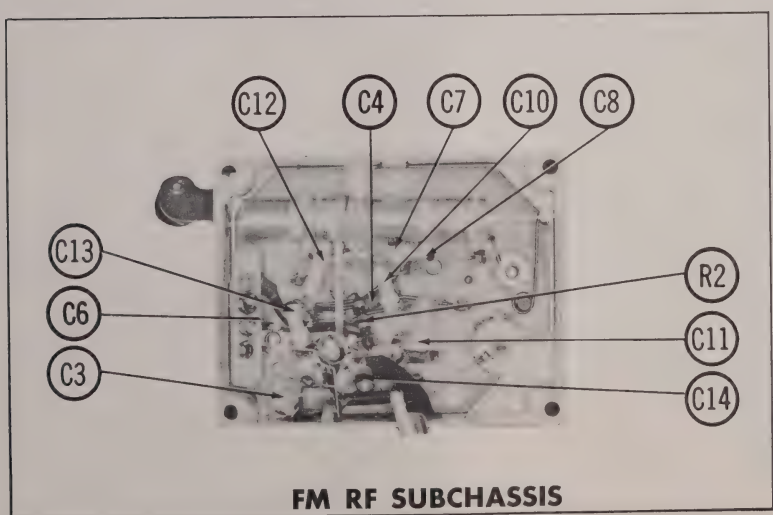


FIG. 2



FM RF SUBCHASSIS

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE
V1	RF Amp.-Conv.	12DT8
V2	1st IF Amplifier	12BA6
V3	2nd IF Amplifier	12BA6
V4	Ratio Det.-AF Amp.	19T8
V5	Output	50C5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA RCA Victor PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■80	175	110008		A0200	FP115	TMS-1220	TVL-1415	
B	▲50	150			BR8035	TC1265	TD-80-350	TVA-1716	
C2	2	50	79181	PRS1300	BBR2-50	TC302	TD-2-50	TVA-1301	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	10 N750 ±1mmf		N750-SI 10	TCN-10	C10Q10U	CCTN-100	CN7-410	10TCU-Q10
C4	1000		SI 1000	D6-102	BYA10D1	CCD-102	B-210	5HK-D10
C5	2-20							
C6	1000		SI 1000	D6-102	BYA10D1	CCD-102	B-210	5HK-D10
C7	20 NPO 5%			TCZ-20	C10Q2C	CCTO-200	CNO-422	10TCC-Q20
C8	20 NPO 5%			TCZ-20	C10Q2C	CCTO-200	CNO-422	10TCC-Q20
C9	2-6							
C10	8.2 P100 ±1mmf					*		
C11	68 N750 5%			TCN-68	C10Q68C	CCTN-680	CN7-468	10TCU-Q68
C12	10 N470 ±1mmf					*		
C13	15 NPO 10%		NPO-SI 15	TCZ-15	C10Q15C	CCTO-150	CNO-150	10TCC-Q15
C14	1000		BPD-001	D6-102	BYA10D1	CCD-102	B-210	5HK-D10
C15	1500		BPD-0015	DD-152	BYA10D15	CCD-152	B-215	5HK-D15
C16	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C17	47		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C18	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C19	6.8 10%		NPO-SI 6.8	TCZ-6R8	C10V68C	CCTO-6R8	CNO-568	10TCC-V68
C20	.01 200V		P288N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S10
C21	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S10
C22	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C23	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C24	.0047 600V		P688N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA RCA Victor PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	110007	B-70-S	A47-1meg-Z	Q13-137	U53	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			Not Req.	SWE-12	76-1	US-26	Power Off-On

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R2	1meg			
R3	1000Ω			
R4	3300Ω			
R5	100K			
R6	1meg			
R7	220Ω			
R8	1meg			
R9	220Ω			
R10	4.7meg			
R11	150Ω			
R12	1200Ω 4W	PW5-1200	4W-SQ-1200	
R13	27Ω 4W 5%	PW5-27	4W-SQ-27	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	RCA Victor PART No.	REPLACEMENT DATA
K1	Ratio Detector Comp.	100mmf, (2) 1500mmf, 22K, 47K, 1meg	110004	
K2	Audio Coupling	220mmf, 4700mmf, (2) 470K	110003	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA RCA Victor PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	NOTES
L1	2nd IF	110005	FM-254	1463	RTC-8599	T633	
L2	Ratio Detector	110006	FM-255	1465	RTC-8600	T635	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA RCA Victor PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2700Ω Tap@ 6%	3-4Ω	79283	A-3031			S-16X	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA RCA Victor PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	104099	4A07	

POWER RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA RCA Victor PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.050A	110043	1N1763	2F4	SR200	

MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M2	FM Tuner	107004	Complete, Less Tube

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial Window	110010	
Dial Pointer	110011	
Dial	110017	
Knob	110013	Models 1-F-2D, 1-F-2E
Knob	110052	Model 1-F-1
Cabinet	Y7122	Gull Gray, Model 1-F-1
Cabinet	Y7118	Champagne White, Model 1-F-2E
Cabinet	Y7117	Charcoal Black, Model 1-F-2D

WIRING DATA

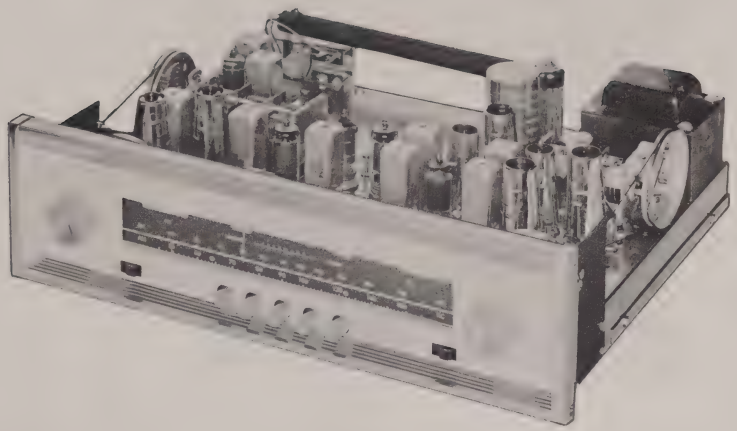
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord (Interlock Type) ..... Use BELDEN No. 8874

PHOTOFACT® Folder

SHERWOOD
MODEL S-2200

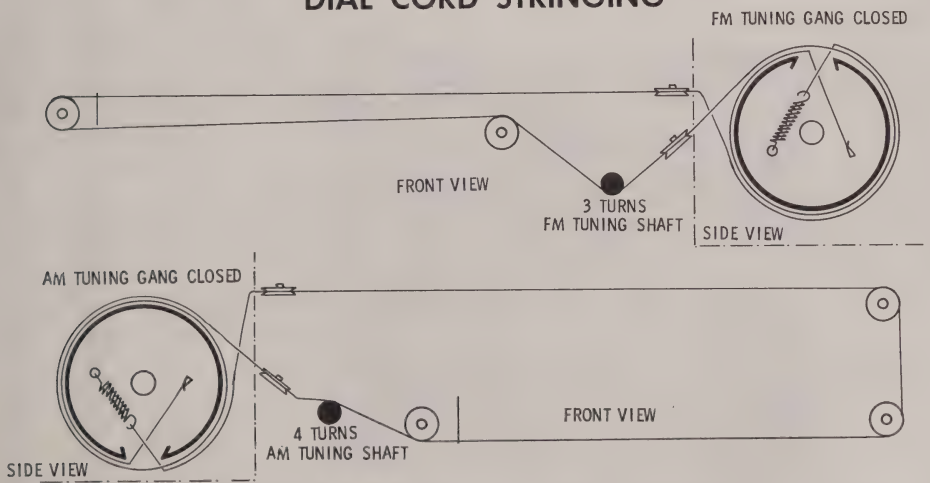
SHERWOOD
MODEL S-2200



SHERWOOD
MODEL S-2200

TRADE NAME	Sherwood Model S-2200 (Serial #0223001 and up)		
MANUFACTURER	Sherwood Electronic Laboratories, Inc., 4300 N. California Ave., Chicago 18, Illinois		
TYPE SET	AC Operated 15 Tube FM-AM Tuner		
POWER SUPPLY	110-120 Volts AC, 50-60 Cycles	RATING	76 Watts, .73 Amp. @117 Volts AC
TUNING RANGE—BROADCAST	530-1650KC	FREQ. MOD.	88 — 108MC

DIAL CORD STRINGING



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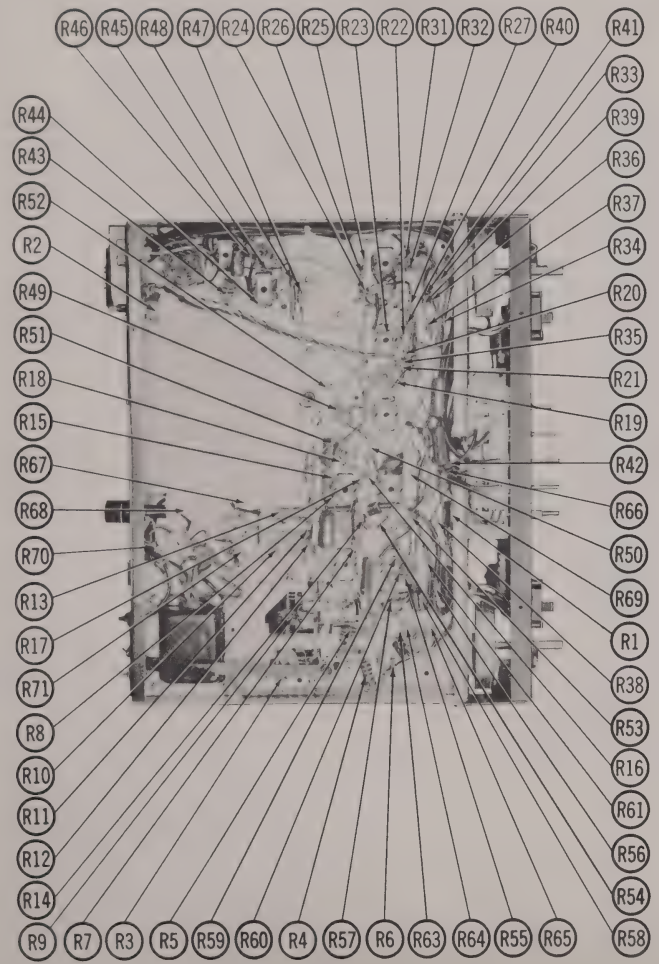
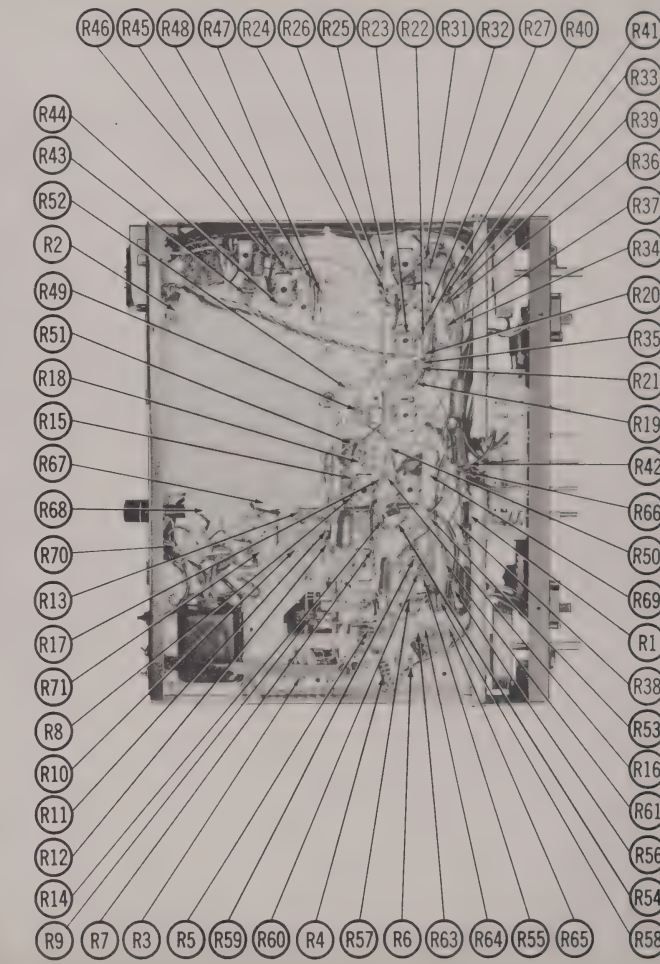
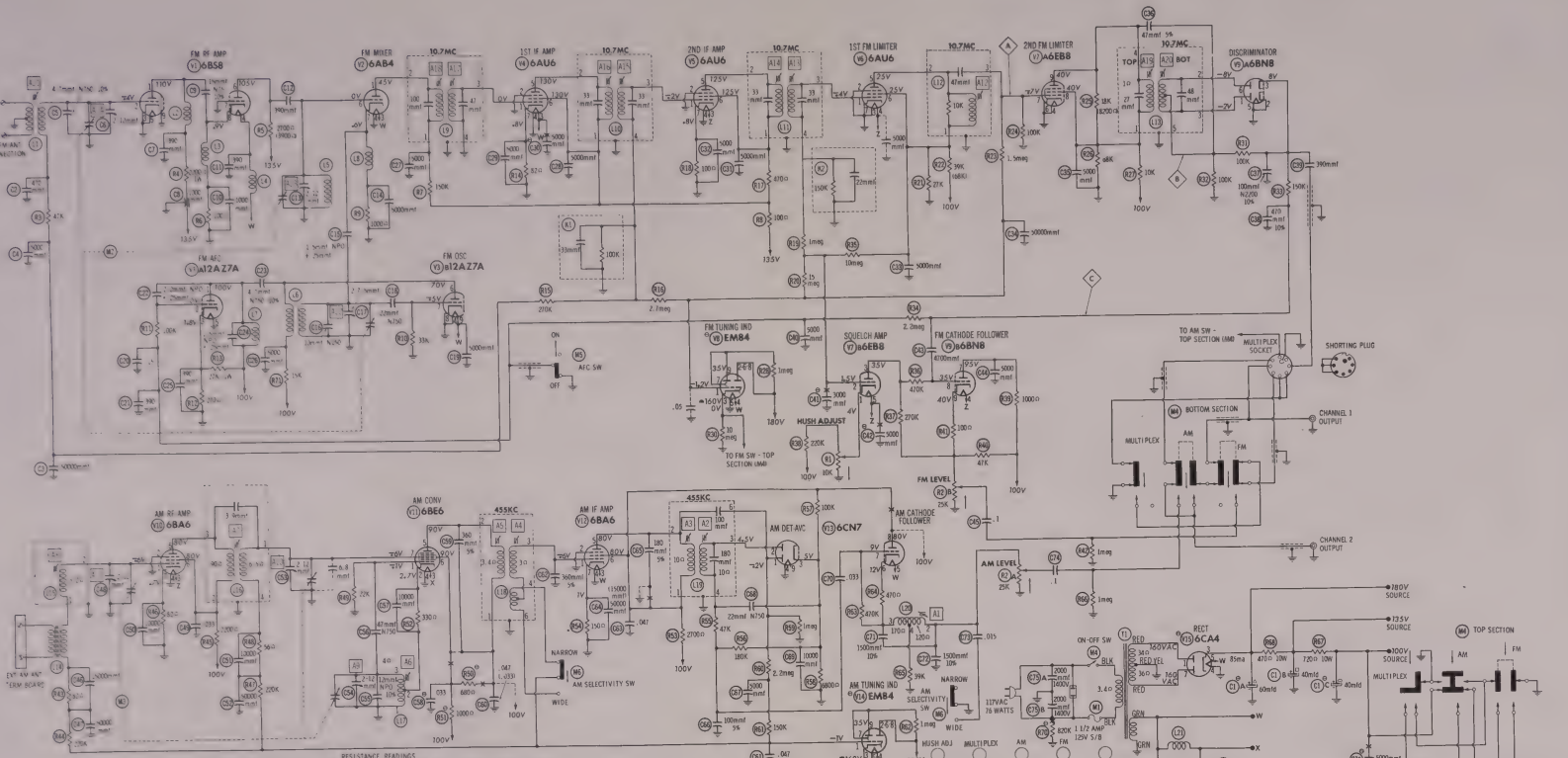


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BS8	↑2100Ω	420K	0Ω	.1Ω	0Ω	↑3100Ω	0Ω	100Ω	0Ω
V2	6AB4	↑150K	0Ω	.1Ω	0Ω	0Ω	0Ω	100Ω		
V3	12AZ7A	↑1300Ω	2.6meg + 100K	270Ω	0Ω	0Ω	↑16 K	33K	0Ω	.1Ω
V4	6AU6	0Ω	0Ω	.1Ω	0Ω	↑520Ω	↑570Ω	820Ω		
V5	6AU6	100K	0Ω	1Ω	0Ω	↑10000Ω	↑10000Ω	100Ω		
V6	6AU6	150K	0Ω	0Ω	.1Ω	↑30K	↑30K	0Ω		
V7	6EB8	● 3000Ω	1.2meg	↑300K	0Ω	.1Ω	0Ω	100K	↑10K	↑10K
V8	EM84	1meg	NC	0Ω - 10meg	.1Ω	0Ω	↑0Ω	↑1meg	NC	↑1meg
V9	6BN8	200K	0Ω	200K	.1Ω	0Ω	100K	↑10000Ω	↑750K	15K
V10	6BA6	3.5meg	0Ω	.1Ω	0Ω	↑34000Ω	↑34000Ω	820Ω		
V11	6BE6	22K	330Ω	.1Ω	0Ω	↑2000Ω	↑22000Ω	3.5meg		
V12	6BA6	3.3meg	0Ω	.1Ω	0Ω	↑3900Ω	↑3900Ω	150Ω		
V13	6CN7	1meg	25K	6800Ω	0Ω	.1Ω	18K	490K	↑3900Ω	NC
V14	EM84	3.3meg	NC	0Ω - 10meg	.1Ω	0Ω	↑0Ω	↑1meg	NC	↑1meg
V15	6CA4	360	NC	¶	0Ω	.1Ω	NC	360	NC	NC

1. DC voltage measurements taken with vacuum tube voltmeter.
2. All voltages measured with 1000 ohm per volt voltmeter.
3. Socket connections are shown as bottom views.
4. Measured values are from socket pin to common ground.
5. Line voltage maintained at 117 volts for voltage readings.
6. Nominal tolerance on component values makes possible a variation in both voltage and resistance readings.
7. Volume control at maximum, no signal applied, for voltage measurements.

ALL MEASUREMENTS MADE IN "AM-FM STEREO" POSITION UNLESS OTHERWISE DESIGNATED.

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
■ MEASURED IN "FM" POSITION.
▲ MEASURED WITH AFC SW IN "OFF" POSITION.
▬ MEASURED IN "AM" POSITION.
† MEASURED FROM PIN 3 OF V15.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
NC NO CONNECTION

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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SHERWOOD MODEL S-2200

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.

Suggested Alignment Tools:
- A1..... GENERAL CEMENT #8721, 8722 WALSCO #2519
- A2 Thru A5, A7, A8, A12 Thru A20.... GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440 WALSCO #2526, 2543, 2544, 2545
- A6, A21..... GENERAL CEMENT #8282, 8606, 8606-L, 9091 WALSCO #2526, 2541, 2542, 2543, 2544
- A9, A10, A11, A22, A23, A24..... GENERAL CEMENT #5004, 5009, 8195, 8274, 8275, 8607, 8728, 8987, 8988, 8989, 9291 WALSCO #2515, 2520, 2522, 2523, 2531, 2532, 2534, 2537, 2538

AM ALIGNMENT—SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .02mfd to pin 7 (grid) of AM Cathode Follower (V13). Low side to chassis.	10KC	AM(Wide) Point of non-interference.	AC probe across Output jack.	A1	Adjust for MINIMUM deflection.
2.	High side thru .01mfd to pin 7 (grid) of AM Converter. Low side to chassis.	455KC (400∿ 30% AM.)	AM (Narrow Point of non-interference.	"	A2, A3, A4, A5	Adjust for maximum deflection.
3.	"	455KC (50KC Swp)	AM (Wide) Point of non-interference.	Vert. amp of SCOPE to Output jack. Low side to chassis.	A2, A3, A4, A5	Retouch for maximum gain and symmetry of response.
4.	Loop	600KC (400∿ 30% AM.)	AM (Narrow) 600KC	AC probe across Output jack.	A6, A7, A8	Adjust for maximum deflection.
5.	"	1400KC	AM (Narrow) 1400KC	"	A9, A10, A11	Adjust for maximum deflection. Repeat Steps 4 and 5.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM—SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	High side to ungrounded tube shield floating over FM Mixer. Low side to chassis.	10.7MC (Unmod.)	(FM) Point of non-interference.	DC probe thru 1meg to point Ⓐ. Common to chassis.	A12, A13, A14, A15, A16, A17, A18	Adjust for maximum deflection.
7.	"	"	"	DC probe thru 1meg to point Ⓑ Common to chassis.	A19	"
8.	"	"	"	DC probe to point Ⓒ. Common to chassis.	A20	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE—SELECTOR IN FM POSITION

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
6.	High side to ungrounded tube shield floating over FM Mixer. Low side to chassis.	10.7MC (450KC Swp)	(FM) Point of non-interference.	Vert. amp. thru 47K to point Ⓐ. Low side to chassis.	A12, A13, A14, A15, A16, A17, A18	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
7.	"	"	"	Vert. amp. thru 47K to point Ⓑ. Low side to chassis.	A19	"
8.	"	"	"	Vert. amp. to point Ⓒ. Low side to chassis.	A20	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A19 for maximum amplitude and straightness of cross-over lines.

FM RF ALIGNMENT—SELECTOR IN FM POSITION

AFC Off

Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9.	Across FM antenna terminals with 120Ω in each lead.	90MC (Unmod.)	(FM) 90MC	DC probe to point Ⓐ. Common to chassis.	L6, L5, A21	Adjust for maximum deflection.
10.	"	106MC	106MC	"	A22, A23, A24	Adjust for maximum deflection. Repeat Steps 9 and 10.

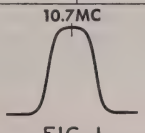


FIG. 1

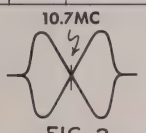
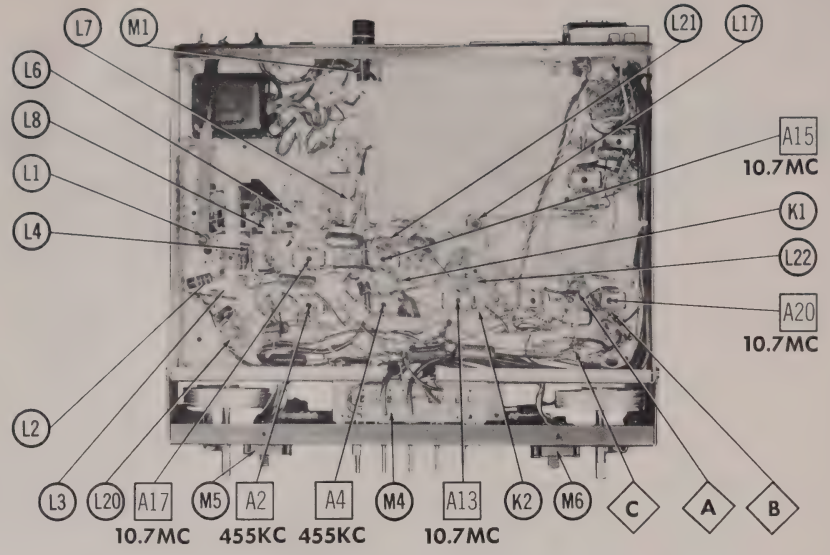
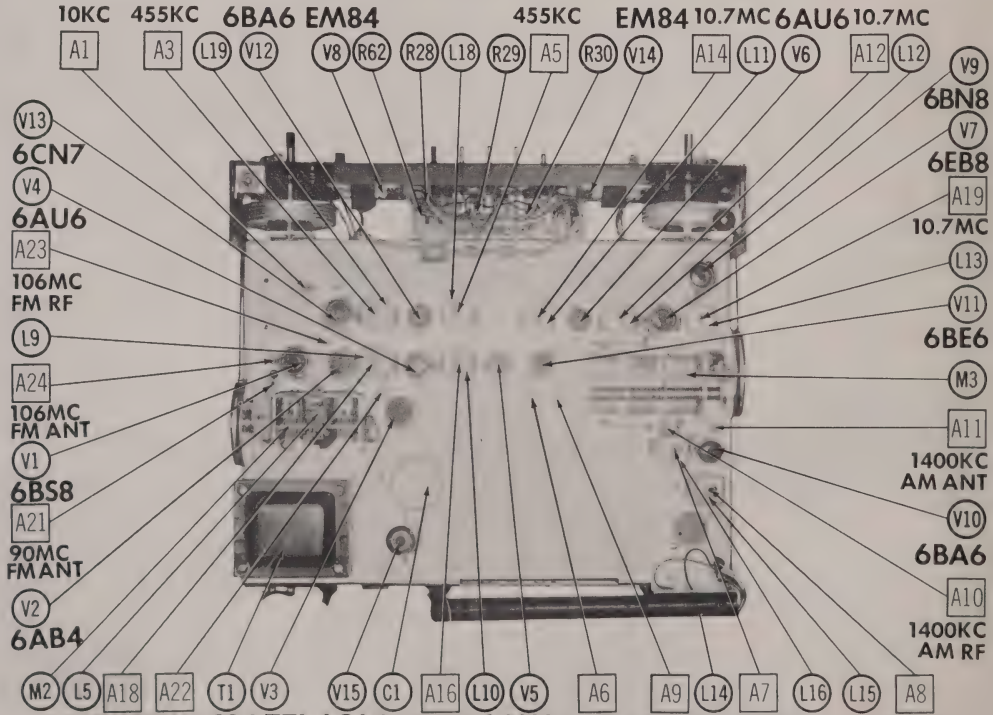


FIG. 2



CHASSIS BOTTOM VIEW-ALIGNMENT, INDUCTOR & MISC. IDENT.



CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
	• GENERAL ELECTRIC •		RAYTHEON • SYLVANIA •		
V1	FM RF Amplifier	6BS8	V9	Discriminator-FM Cathode Follower	6BN8
V2	FM Mixer	6AB4			
V3	FM Osc. -AFC	12AZ7A	V10	AM RF Amplifier	6BA6
V4	1st FM IF Amplifier	6AU6	V11	AM Converter	6BE6
V5	2nd FM IF Amplifier	6AU6	V12	AM IF Amplifier	6BA6
V6	1st FM Limiter	6AU6	V13	AM Det. -AVC-AM Cath. Follower	6CN7
V7	2nd FM Limiter-Squelch Amp.	6EB8			
V8	FM Tuning Indicator	EM84 (6FG6) *	V14	AM Tuning Indicator	EM84 (6FG6) *
			V15	Rectifier	6CA4 (EZ81) *

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	SHERWOOD PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲80	250	A120D1-5	AFH3-101-20	D0020	FP327, 89	TMD-2315	TVL-3583	Note 1
B	■40	250			BR3025	TC55	TD-60-250		
C	▲40	250							Note 1

Note 1. In some versions C1A and C1C are reversed.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C3	50000		BPD-05	DD-503	CUB4S5	4DP-3-503	GP150	5HK-S50
C4	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C5	4.7 N750 10%			DTN-5	C10V5U	CCTN-050	CN-547	10TCC-V50
C6	2-12							
C7	390		DI-390	DD-391	L10T39	CCD-391	B-339	10TS-T39
C8	1000		EF-001	MFT-1000		CCF-102	CT280A	
C9	15 N75 10%					*		
C10	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C11	390		DI-390	DD-391	L10T39	CCD-391	B-339	10TS-T39
C12	390		DI-390	DD-391	L10T39	CCD-391	B-339	10TS-T39
C13	2-12							
C14	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C15	1.5 NPO ± .25mmf		NPO-DI 1.5	DTZ-1R5	C10V15C		CNO-515	10TCC-V15
C16	10 N150					*		10TCP-Q10
C17	2-7.5			829-7				
C18	22 N750		N750-DI 22	DTN-22	C10Q22U	CCTN-220	CN7-422	10TCU-Q22
C19	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C20	.15 200V		P288N-15		CUB2P15	2DP-3-154	GEM-2015	2TM-P15
C21	390		DI-390	DD-391	L10T39	CCD-391	B-391	10TS-T39
C22	2.2 NPO ± .25mmf		NPO-DI 2.2	DTZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C23	4.7 N750 10%			DTN-5	C10V5U	CCTN-050	CN7-547	10TCU-V50
C24	1.5 NPO ± .25mmf		NPO-DI 1.5	DTZ-1R5	C10V15C		CNO-515	10TCC-V15
C25	390		DI-390	DD-391	L10T39	CCD-391	B-339	10TS-T39
C26	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C27	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C28	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C29	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C30	5000	Note 1	BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C31	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C32	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C33	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C34	50000		BPD-05	DD-503	CUB4S5	4DP-3-503	GP150	5HK-S50
C35	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C36	47 5%		1469-000047	TCZ-47	22R5Q47	CM-19B-470J	CNO-447	MS-447
C37	100 N2200 10%					*		
C38	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C39	390		DI-390	DD-391	L10T39	CCD-391	B-339	10TS-T39
C40	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C41	3000	Note 1	DI-3000	DD-302	BYA10D3	CCD-302	B-230	5HK-D30
C42	5000	Note 1	BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C43	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C44	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C45	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C46	15000		BPD-015	DD-153	BYA10S15	CCD-153	B-115	5HK-S15
C47	50000		BPD-05	DD-503	CUB4S5	4DP-3-503	GP150	5HK-S50
C48	2-12							
C49	.033 400V		P488N-033	DD-303	CUB6S33	4DP-2-333	GEM-4133	6TM-S33
C50	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C51	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C52	50000		BPD-05	DD-503	CUB4S5	4DP-3-503	GP150	5HK-S50
C53	2-12							
C54	2-12							
C55	12 NPO 10%			TCZ-12		C10Q12C	CCTO-120	CNO-412	10TCC-Q12
C56	47 N750		N750-DI 47	DTN-47		C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C57	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C58	.033 400V	Note 1	P488N-033	DD-303	CUB6S33	4DP-2-333	GEM-4133	6TM-S33
C59	360 5%		1469-00036		5R5T36	CM-19B-361J		MS-336
C60	.047 400V	(.033) †	P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C61	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C62	360 5%		1469-00036		5R5T36	CM-19B-361J		MS-336
C63	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C64	50000	(15000) †	BPD-05	DD-503	CUB4S5	4DP-3-503	GP150	5HK-S50
C65	180 5%		1469-00018	TCZ-180	22R5T18	CM-19B-181J	CNO-318	MS-318
C66	100 5%		1469-0001	TCZ-100	22R5T1	CM-19B-101J	CNO-310	MS-310
C67	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C68	22 N750		N750-DI 22	DTN-22	C10Q22U	CCTN-220	CN7-422	10TCU-Q22
C69	10000 500V		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C70	.033 400V		P488N-033	DD-303	CUB6S33	4DP-2-333	GEM-4133	6TM-S33
C71	1500 10%		DI-1500	DD-152	1R5D15	CCD-152	GP215	10TS-D15
C72	1500 10%		DI-1500	DD-152	1R5D15	CCD-152	GP215	10TS-D15
C73	.015 400V		P488N-015	DD-153	CUB6S15	4DP-1-153	GEM-4115	4TM-S15
C74	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C75A	2000 1400V		DAC-3	DD3-202	BYA10D2	3CCD-202	B2X220	5HK-2D20
B	2000 1400V		DAC-3		BYA10D2	3CCD-202		
C76	5000	Note 1	BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50

Note 1. Not used in some versions.
† Alternate Value.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	SHERWOOD PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	10K	½	A670D5					Hush Adjust (Squelch)
R2A	25K	½	A670D6					AM Level
B	25K	½						FM Level

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS	ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R3	47K				R8	100Ω			
R4	2200Ω 1W				R9	1000Ω			
R5	2700Ω			(3900Ω) *	R10	33K			
R6	100Ω				R11	100K			
R7	150K				R12	270Ω			

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R13	27K 1W			
R14	82Ω			
R15	270K			
R16	2.7meg			
R17	470Ω			
R18	100Ω			
R19	1meg			
R20	15meg			
R21	27K			
R22	39K			(68K) *
R23	1.5meg.			
R24	100K			
R25	18K			(8200Ω) *
R26	68K			
R27	10K			
R28	1meg			
R29	10meg			
R30	10meg			
R31	100K			
R32	100K			
R33	150K			
R34	2.2meg			
R35	10meg			
R36	470K			
R37	270K			
R38	220K			
R39	1000Ω			
R40	47K			
R41	100Ω			
R42	1meg			

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R43	82Ω			
R44	220K			
R45	2200Ω			
R46	82Ω			
R47	220K			
R48	56Ω			
R49	22K			
R50	680Ω			Note 1
R51	1000Ω			Note 1
R52	330Ω			
R53	2700Ω			
R54	150Ω			
R55	47K			
R56	180K			
R57	100K			
R58	6800Ω			
R59	1meg			
R60	2.2meg			
R61	150K			
R62	1meg			
R63	470K			
R64	470Ω			
R65	39K			
R66	1meg			
R67	720Ω 10W	PW10-720Ω	10W-720Ω	
R68	470Ω 10W	PW5-470Ω	10W-470Ω	
R69	1.8Ω 5W	PW5-1.8Ω	5W-SQ-1.8Ω	
R70	820K			Note 1
R71	15K			

Note 1. Not used in some versions.
* Alternate Value.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SHERWOOD PART No.	REPLACEMENT DATA
K1	2nd FM IF Grid Bias	33mmf, 100K		
K2	3rd FM IF Grid Bias	22mmf, 150K		

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA SHERWOOD PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	NOTES
L1	FM Ant.						
L2	RF Choke (1.2uh)		BC-561	4602	RTC-8515	T855	
L3	Cathode Choke (1.2uh)		BC-561	4602	RTC-8515	T855	
L4	Fil. Choke(2.6uh)		SW-630	4606	RTC-8517	T857	
L5	FM RF						
L6	FM Osc.						
L7	RF Choke (1.2uh)		BC-561	4602	RTC-8515	T855	
L8	Cathode Choke (3.9uh)	①	BC-564	4608	RTC-8518	T858	① IRC Part #CLA
L9	1st FM IF		FM-254	1463	RTC-8599	T633	
L10	2nd FM IF		FM-254	1463	RTC-8599	T633	
L11	3rd FM IF		FM-254	1463	RTC-8599	T633	
L12	FM Limiter						
L13	Discriminator		FM-253	1464	RTC-8665	T634	
L14	Loopstick		BC-418	705-A		T532	
L15	AM Ant.		BC-390	A-121-A	RTC-8631	T506	
L16	AM RF						

COILS (RF-IF) (cont)

ITEM No.	USE	REPLACEMENT DATA SHERWOOD PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	NOTES
L17	AM Osc.		BC-393	70-OSC	RTC-8647	T502	
L18	1st AM IF						
L19	2nd AM IF		BC-353 ▲	12-C2 ▲	RTC-8633 ▲	T502 ▲	▲ Connect 100mmf capacitor externally
L20	10KC Filter						
L21	Fil. Choke(2.6uh)		SW-630	4606	RTC-8515	T857	
L22	Fil. Choke(2.2uh)		SW-630	4606	RTC-8515	T857	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA SHERWOOD PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	117V@ .73A	320VCT @ .085A DC	6.3V@ 5.6A	A922D2-3					

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA SHERWOOD PART No. FUSE	SHERWOOD PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	1½A 125V S/B			31301.5 (3AG 1¼A 125V) S/B	342001	MDL 1½	HKP

MISCELLANEOUS

ITEM No.	PART NAME	SHERWOOD PART No.	NOTES
M2	Tuning Cap.		FM, 3 Gang
M3	Tuning Cap.		AM, 3 Gang
M4	Switch		Function Selector (Pushbutton Type, Includes Power Off, FM, AM, MX)
M5	Switch		FM AFC-Off (SPDT, Slide Type)
M8	Switch		AM Wide, AM Narrow (DPDT, Slide Type)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT® Folder with CIRCUITRACE®

SILVERTONE MODEL 50 (Ch. 528.53960)

SILVERTONE MODEL 50 (Ch. 528.53960)

TRADE NAME	Silvertone Model 50 (Ch. 528.53960)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois
TYPE SET	AC Operated 4 Tube AM Receiver With Stereo Amplifier And 4 Speed Automatic Record Changer
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles
TUNING RANGE—BROADCAST	540 — 1600KC RATING 32 Watts, .36 Amp. @117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER 528.57280 OR 528.57281 — SEE SIMILAR SILVERTONE 528.56100 SERIES — PHOTOFACT SET 417 FOLDER 10 OR RECORD CHANGER MANUAL RC-12

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
A1 thru A4.. GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A5, A7..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520
A6..... GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545

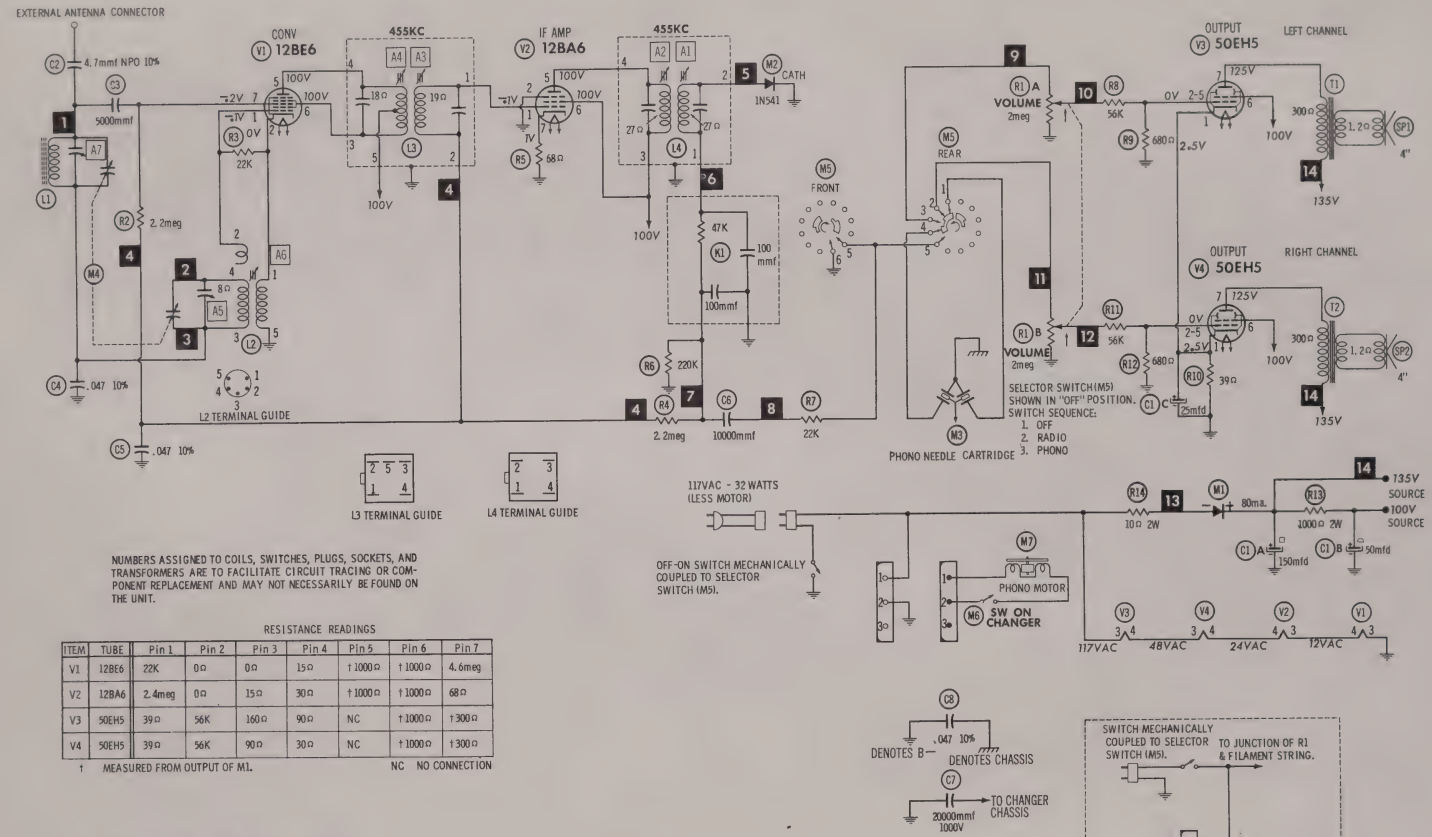
	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of Converter. Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	"	1630KC	"	"	A5	"
3.	"	532KC	Tuning gang fully closed.	"	A6	Adjust for maximum output. Repeat Steps 2 and 3.
4.	Loop	1400KC	1400KC Signal.	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1961 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

KP343

SET 533 FOLDER 11



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	0Ω	0Ω	15Ω	†1000Ω	†1000Ω	4.6meg
V2	12BA6	2.4meg	0Ω	15Ω	30Ω	†1000Ω	†1000Ω	68Ω
V3	50EH5	39Ω	56K	160Ω	90Ω	NC	†1000Ω	†300Ω
V4	50EH5	39Ω	56K	90Ω	30Ω	NC	†1000Ω	†300Ω

† MEASURED FROM OUTPUT OF M1. NC NO CONNECTION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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SILVERTONE MODEL 50 (Ch. 528.53960)

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Converter	12BE6	V3	Left Channel Output	50EH5
V2	IF Amplifier	12BA6	V4	Right Channel Output	50EH5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■150	150	18-115-5				TMT-3106 †		
B	▬50	150							
C	25	25							

† Use printed circuit adaptors TMAL and TMAS.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	4.7 NPO 10%		NPO-SI 4.7	TCZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C3	5000		DI-5000	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C4	.047 400V 10%		V84C4S47		PM4S47	4DP-3-473	GEM-I615	4TM-S47
C5	.047 400V 10%		V84C4S47		PM4S47	4DP-3-473	GEM-I615	4TM-S47
C6	10000		BPD-01	DD-103	BYA10D1	CCD-103	GP110	5HK-S10
C7	20000 1000V		BPD-02	DD-203			B-120	10TS-S20
C8	.047 400V 10%		V84C4S47		PM4S47	4DP-3-473	GEM-I615	4TM-S47

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg		24-400	B-76	AD47-2meg-Z		FA26A	Volume, Left Channel
B	2meg			SR-76	Not Req.		RU16A	Volume, Right Channel
C	Shaft			Not Req.	FS-3		CS3500	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	2.2meg	
R3	22K	
R4	2.2meg	
R5	68Ω	
R6	220K	

ITEM No.	RATING	REMARKS
R7	22K	
R8	56K	
R9	680K	
R10	39Ω	
R11	56K	

ITEM No.	RATING	REMARKS
R12	680K	
R13	1000Ω	
R14	10Ω 2W	Pt. #43-30-0

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA SILVERTONE PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	NOTES
L1	Loopstick	32-172-0 *	BC-419	705-A		* Includes C2
L2	Osc.	10-55-4				
L3	Input IF Trans.	10-136-2				
L4	Output IF Trans.	10-142-2	BC-357	13-PC2	RTC-8642	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA SILVERTONE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2800Ω	6-8Ω	80-134-1					
T2	2800Ω	6-8Ω	80-134-1					

PRINTED BOARD

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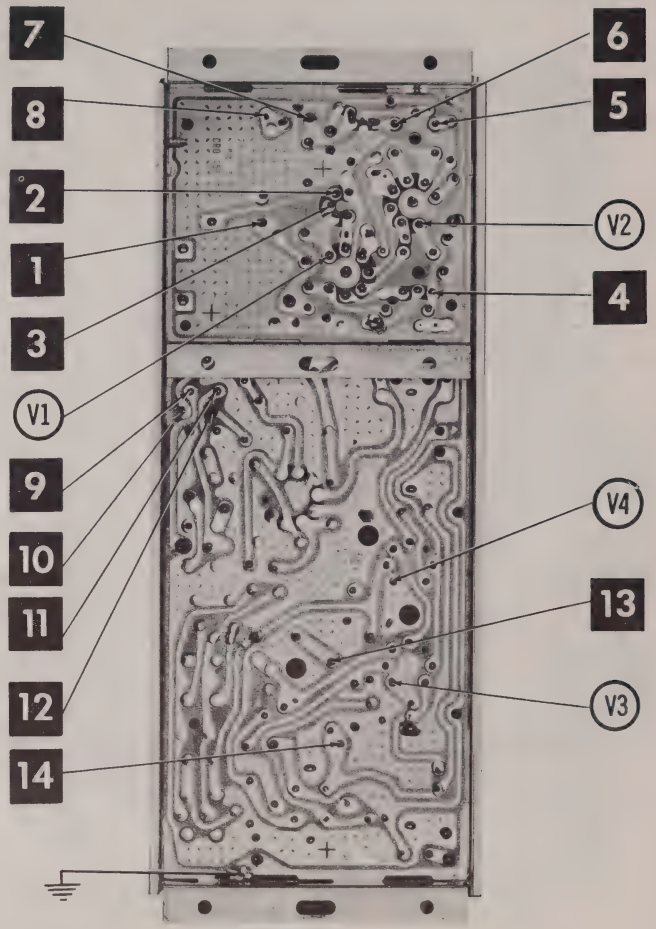
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SILVERTONE PART No.	QUAM PART No.	
SP1	4"	PM	6-8Ω	33-447-4	4A05Z8	
SP2	4"	PM	6-8Ω	33-447-4	4A05Z8	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SILVERTONE PART No.	REPLACEMENT DATA
K1	Diode RF Filter	100mmf, 100mmf, 47K	13-2-2	Aerovox PA-97 Centralab PC-50 Cornell-Dubilier 111TM1 Sprague D-1

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	SILVERTONE PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.080A	*		1N1763 *	K200 *	SR200 *	* Silicon Type

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		SILVERTONE PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N541		1N60	1N60	Detector (Pigtail)

PHONO CARTRIDGE & NEEDLES

*NEEDLE LISTINGS SHOWN ARE FOR RESPECTIVE REPLACEMENT CARTRIDGES ONLY.

ITEM No.	REPLACEMENT DATA								NOTES
	SILVERTONE PART No.		ASTATIC PART No.		ELECTRO-VOICE PART No.		SONOTONE PART No.		
	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	
M3	33-323-0	83-1338* (78RPM) 83-1288* (LP)	76-TS-TB	N8-7 * N8-3 *	96T	Not Req.	12TH-S	Not Req.	

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M4	Tuning Cap.	19-91-2	2 Gang
M5	Switch	69-325-0	Function Selector (Rotary Wafer Type)
M6	Switch		Off-On (Part of Changer)
M7	Motor	59-162	Phono Drive (Part of Changer Ch. 528.57280)
	Motor	59-158	Phono Drive (Part of Changer Ch. 528.57281)
	Printed Board	84-11367-0	AM, Complete, Less Tubes
	Printed Board	25-30-1	AM, Board Only
	Printed Board	84-11368-0	Amplifier, Complete, Less Tubes
	Printed Board	25-27-1	Amplifier, Board Only

CABINETS & CABINET PARTS

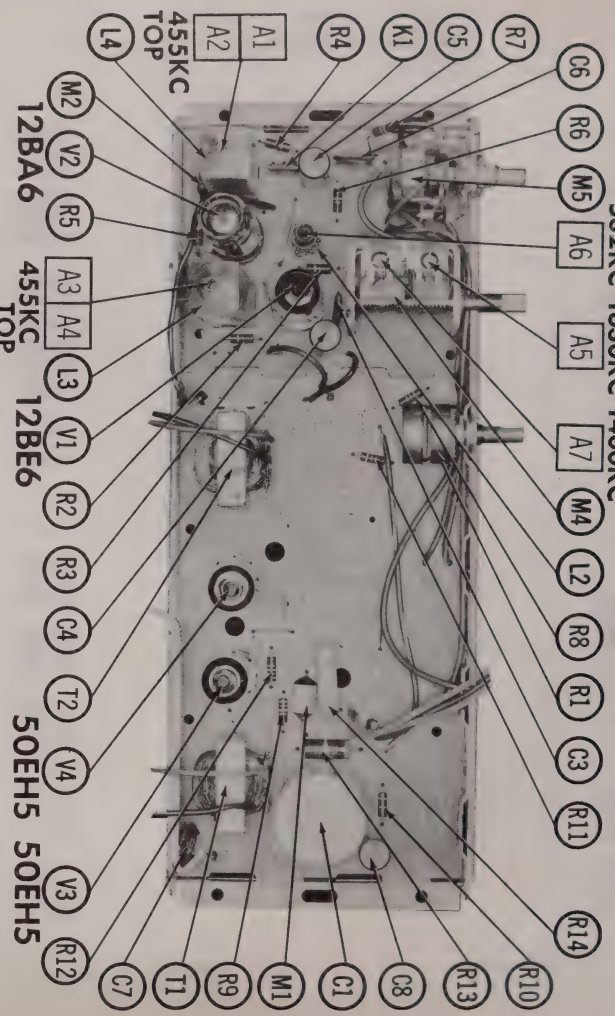
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	52-1403-0	Tuning
Knob	52-1401-0	Volume
Knob	52-1400-0	Selector

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—TOP VIEW



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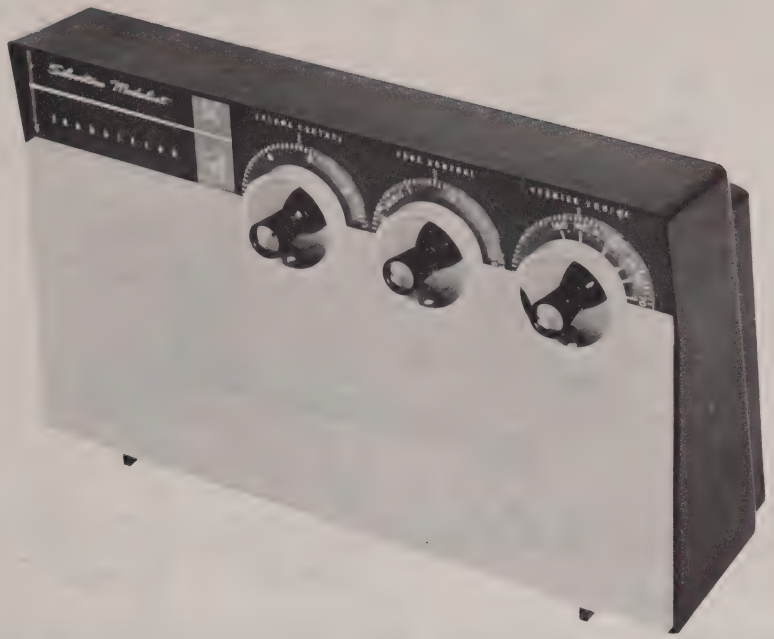
SILVERTONE MODEL 1019 (Ch. 132.60701)

SILVERTONE MODEL 1019 (Ch. 132.60701)



SILVERTONE MODEL 1019 (Ch. 132.60701)

TRADE NAME	Silvertone Model 1019 (Ch. 132.60701)		
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois		
TYPE SET	Battery Operated Transistorized AM Receiver		
POWER SUPPLY	9 Volts DC	RATING	6MA @ 9 Volts DC (No Signal, Min. Volume)
TUNING RANGE—BROADCAST	540 — 1650KC		20MA @ 9 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Set Radio-Phono Switch to "Radio"

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
A1, A2, A3.....GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A4, A7, A8.... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520
A5, A6.....GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .05mfd to antenna stator lug of tuning gang. Low side to chassis.	455KC (400∿ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3	Adjust for maximum output.
2.	Loop	1670KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	600KC	600KC	"	A5, A6	"
4.	"	1400KC	1400KC Signal.	"	A7, A8	Adjust for maximum output. Repeat Steps 2, 3 and 4.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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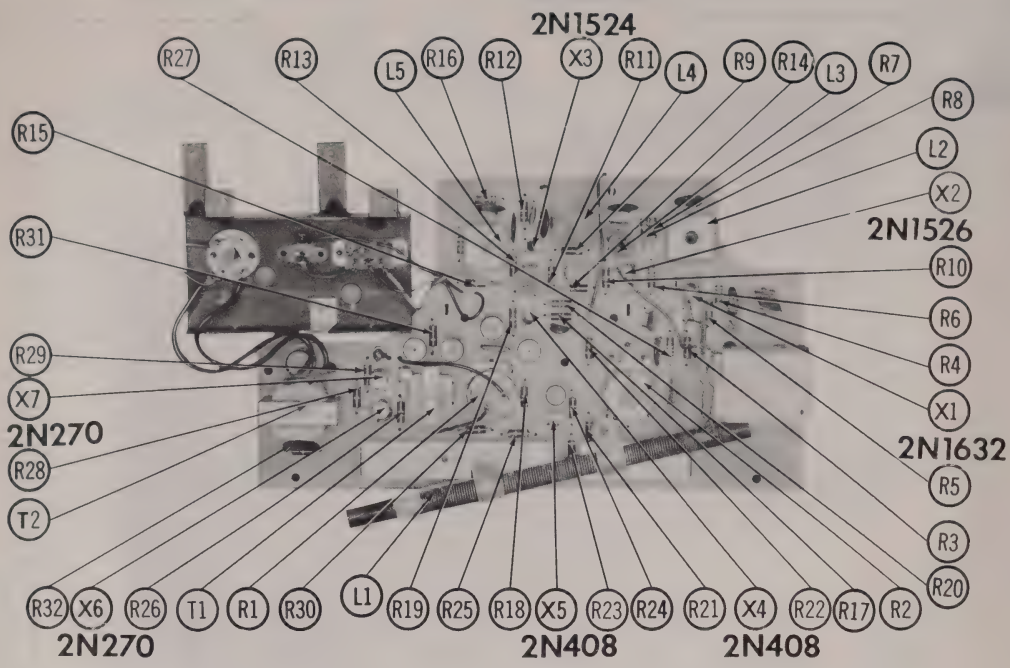
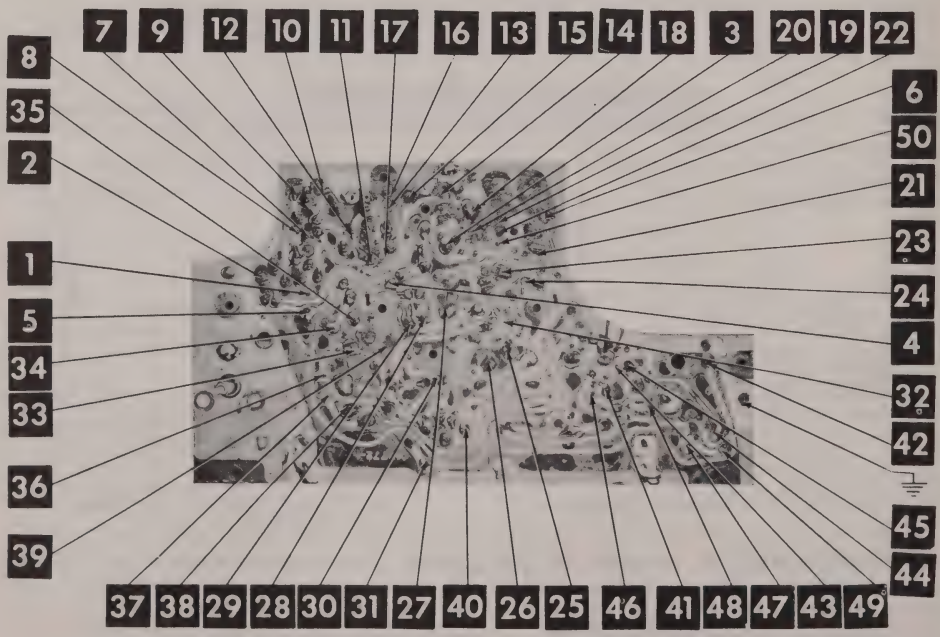
SET 533 FOLDER 12



CHASSIS TOP VIEW-RESISTOR, INDUCTOR & TRANSISTOR IDENT.



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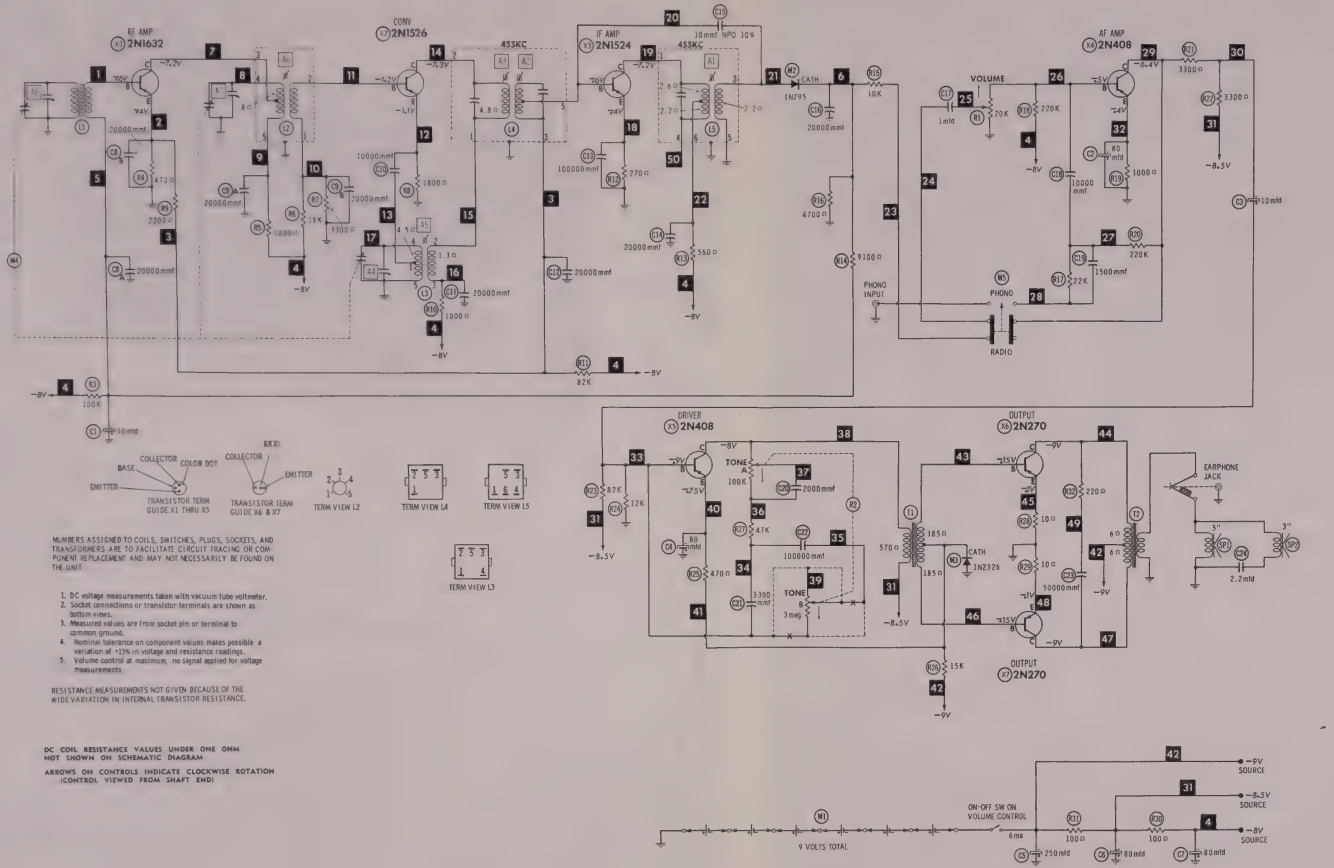

TRANSISTOR TERM GUIDE X1 THRU X5

TRANSISTOR TERM GUIDE X6 & X7

TERM VIEW L2

TERM VIEW L4

TERM VIEW L5

TERM VIEW L3

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE
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SILVERTONE MODEL 1019 (Ch. 132.60701)

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N1632	RF Amplifier	2N1632			PNP
X2	2N1526	Converter	2N1526			PNP
X3	2N1524	IF Amplifier	2N1524			PNP
X4	2N408	AF Amplifier	2N408	2N362	2N408	PNP
X5	2N408	Driver	2N408	2N362	2N408	PNP
X6	2N270	Output	2N270	2N360	2N270	PNP
X7	2N270	Output	2N270	2N360	2N270	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	10	12	47668-1	BCD12010	ECPB408	PET1760	MLV10-12	VL-1127	
C2	80	12	47668-2	PTT-12100	ECPB416	PET1500	MLV100-12	VL-1180	
C3	10	12	47668-1	BCD12010	ECPB408	PET1760	MLV10-12	VL-1127	
C4	80	12	47668-2	PTT-12100	ECPB416	PET1500	MLV100-12	VL-1180	
C5	250	12	47668-3	BCD12250	ECPB421		MLV200-12	TE-1138	
C6	80	12	47668-2	PTT-12100	ECPB416	PET1500	MLV100-12	VL-1180	
C7	80	12	47668-2	PTT-12100	ECPB416	PET1500	MLV100-12	VL-1180	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C8A	20000		BPD-2X02	DD-203	BYB6S2	CCD-203	B-120	5HK-2S20
B	20000			DD-203	BYB6S2	CCD-203	B-120	
C9A	20000		BPD-2X02	DD-203	BYB6S2	CCD-203	B-120	5HK-2S20
B	20000			DD-203	BYB6S2	CCD-203	B-120	
C10	10000		BPD-01	DD-103	BYA1081	CCD-103	B-110	5HK-S10
C11	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C12	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C13	100000 10V			UK10-104	H-05P1	IDP-2-104	TA-010	HY-320
C14	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C15	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C16	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C17	1mfd 3V	#44684-9		UK-105				HY-120
C18	10000		BPD-01	DD-103	BYA1081	CCD-103	B-110	5HK-S10
C19	1500		BPD-0015	DD-152	BYA10D15	CCD-152	B-215	5HK-D15
C20	2000		BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C21	3300		BPD-0033	DD-332	BYA10D33	CCD-332	B-233	5HK-D33
C22	100000 10V			UK10-104	H-05P1	IDP-2-104	TA-010	HY-320
C23	50000		BPD-05	DD-503	H-05S5	IDP-2-503	TA-150	5HK-S50

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C24	2.2mfd 3V			UK-225				HY-150

Silvertone Part Number.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	20K	1/2	49000-1					Volume
B	Switch							Power Off-On
R2A	100K	1/2	47100-8					Tone
B	3meg							Tone

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R3	100K				R18	220K			
R4	470Ω				R19	1000Ω			
R5	1000Ω				R20	220K			
R6	18K				R21	3300Ω			
R7	3300Ω				R22	3300Ω			
R8	1800Ω				R23	82K			
R9	2200Ω				R24	12K			
R10	1000Ω				R25	470Ω			
R11	82K				R26	15K			
R12	270Ω				R27	47K			
R13	560Ω				R28	10Ω			
R14	9100Ω				R29	10Ω			
R15	10K				R30	100Ω			
R16	4700Ω				R31	100Ω			
R17	22K				R32	220Ω			

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		SILVERTONE PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	Loopstick	46861-6		2003		T525	
L2	RF	47655-2					
L3	Osc.	45783-18					
L4	1st IF	47733-2					
L5	2nd IF	45900-13					

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	SILVERTONE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.2	1	45604-9					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	SILVERTONE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	700Ω CT	6-8Ω	45838-3					

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SILVERTONE PART No.	QUAM PART No.	
SP1	5"	PM	6-8Ω	45599-8	5A1Z6.4	
SP2	3"	PM	6-8Ω	48999-1		

BATTERIES

ITEM No.	VOLTAGE	SILVERTONE PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	1.5V	6445 *		230 *		A100 *		M-13R *	* 6 Required

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		SILVERTONE PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N295			1N295	1N295	Detector (Pigtail)
M3	1N2326					Bias Regulator (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M4	Tuning Cap	48714	3 Gang
M5	Switch	47305	Radio-Phono (DPDT Slide Type)

CABINETS & CABINET PARTS

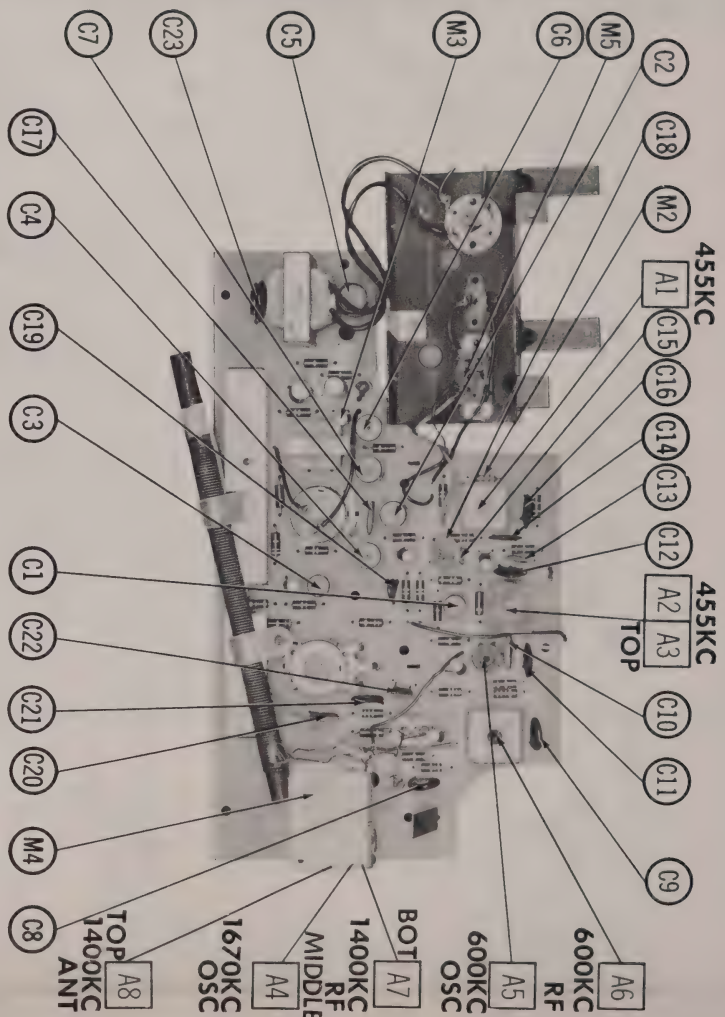
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial Window	48703	
Dial Scale	48704	Tuning
Dial Scale	48705	Volume
Dial Scale	48706	Tone
Knob	48708-29	Tuning
Knob	48709-29	Volume, Tone
Cabinet Front	49419-67	Ivory
Cabinet Back	48701-48	Brown

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

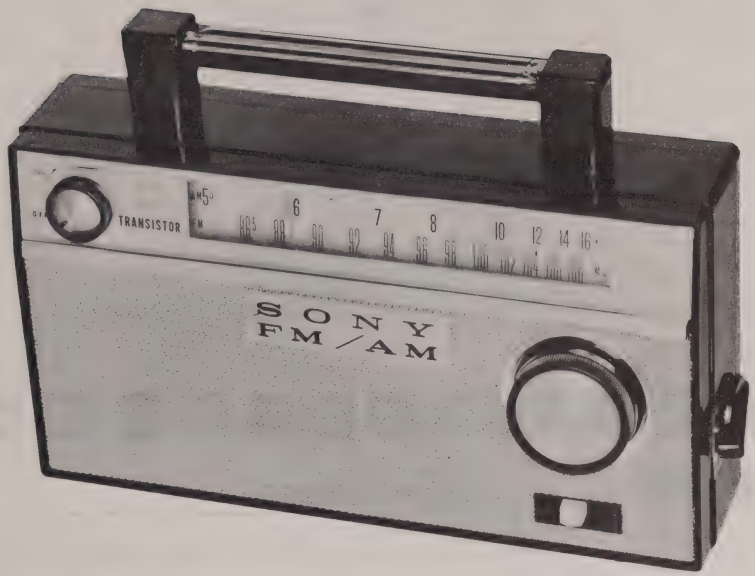
CHASSIS—TOP VIEW



PHOTOFACT® Folder with CIRCUITRACE®

SONY MODEL TFM-121

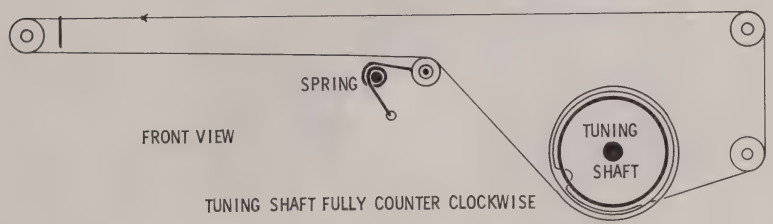
SONY MODEL TFM-121



SONY MODEL TFM-121

TRADE NAME	Sony Model TFM-121		
IMPORTER	Sony Corp. of America, 514 Broadway, New York 12, N. Y.		
TYPE SET	Battery Operated Transistorized Portable FM-AM Receiver		
POWER SUPPLY	6 Volts DC	RATING	15MA @ 6 Volts DC (No Signal, Min. Volume) 40MA @ 6 Volts DC (Signal, Normal Volume)
TUNING RANGE—BROADCAST	535 — 1605KC	FREQ. MOD.	88 — 108MC

DIAL CORD STRINGING



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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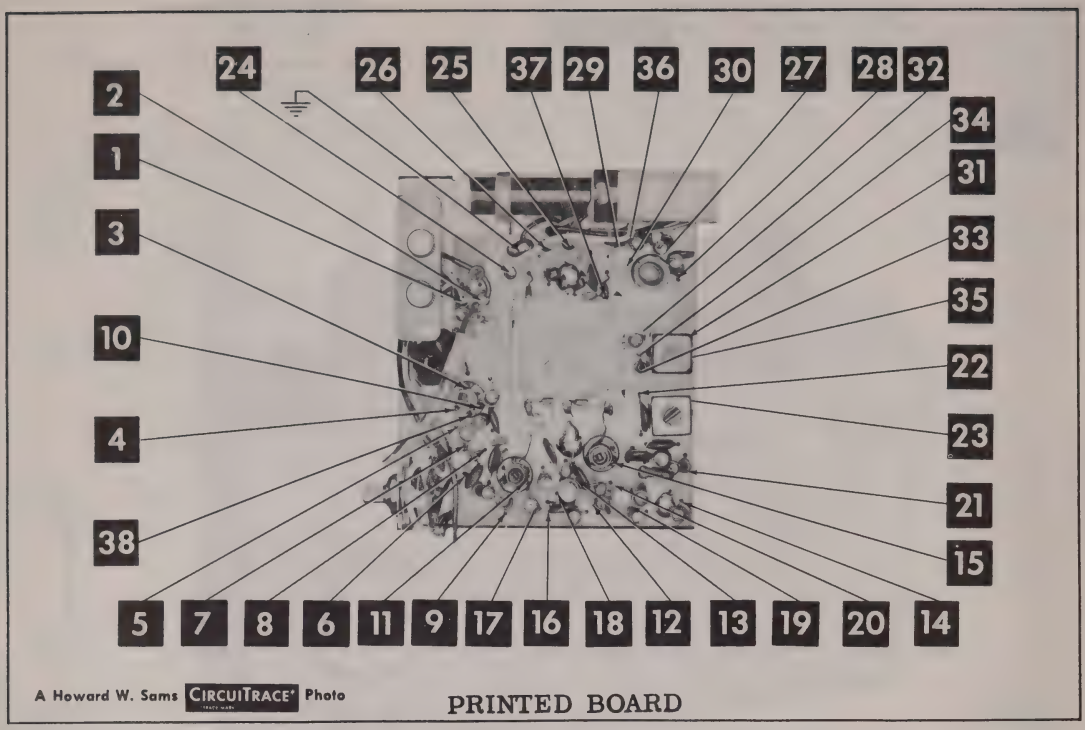
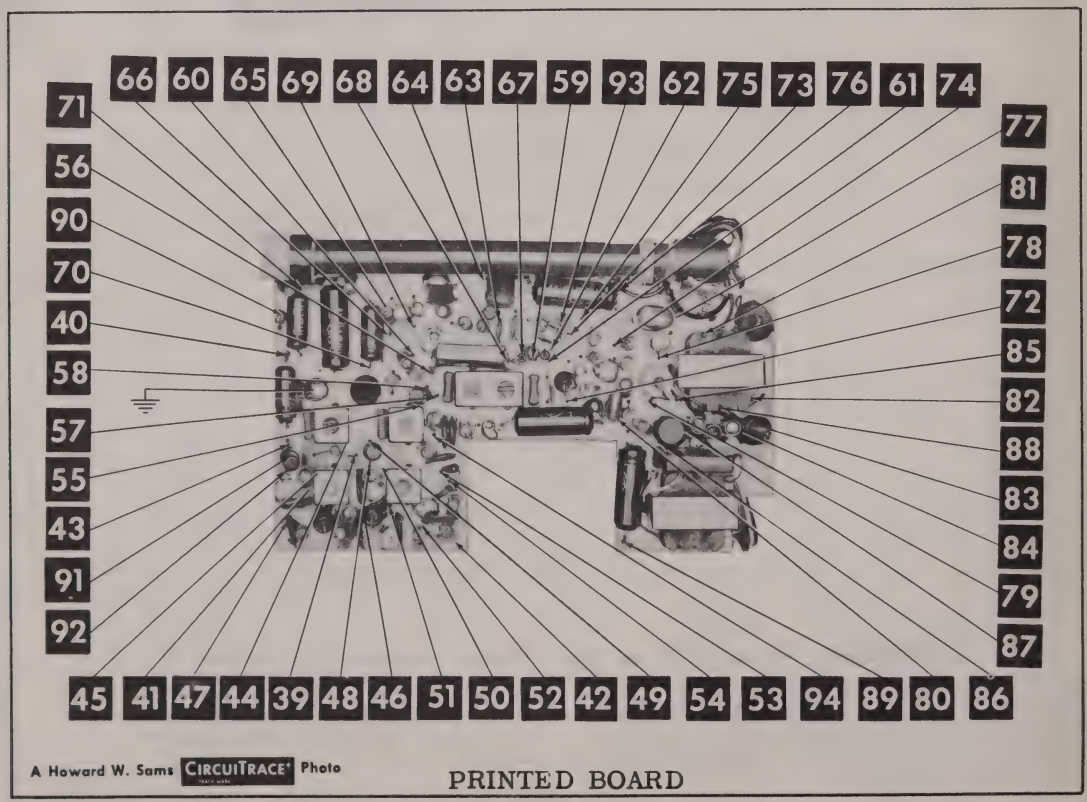
KF459

SET 533 FOLDER 13



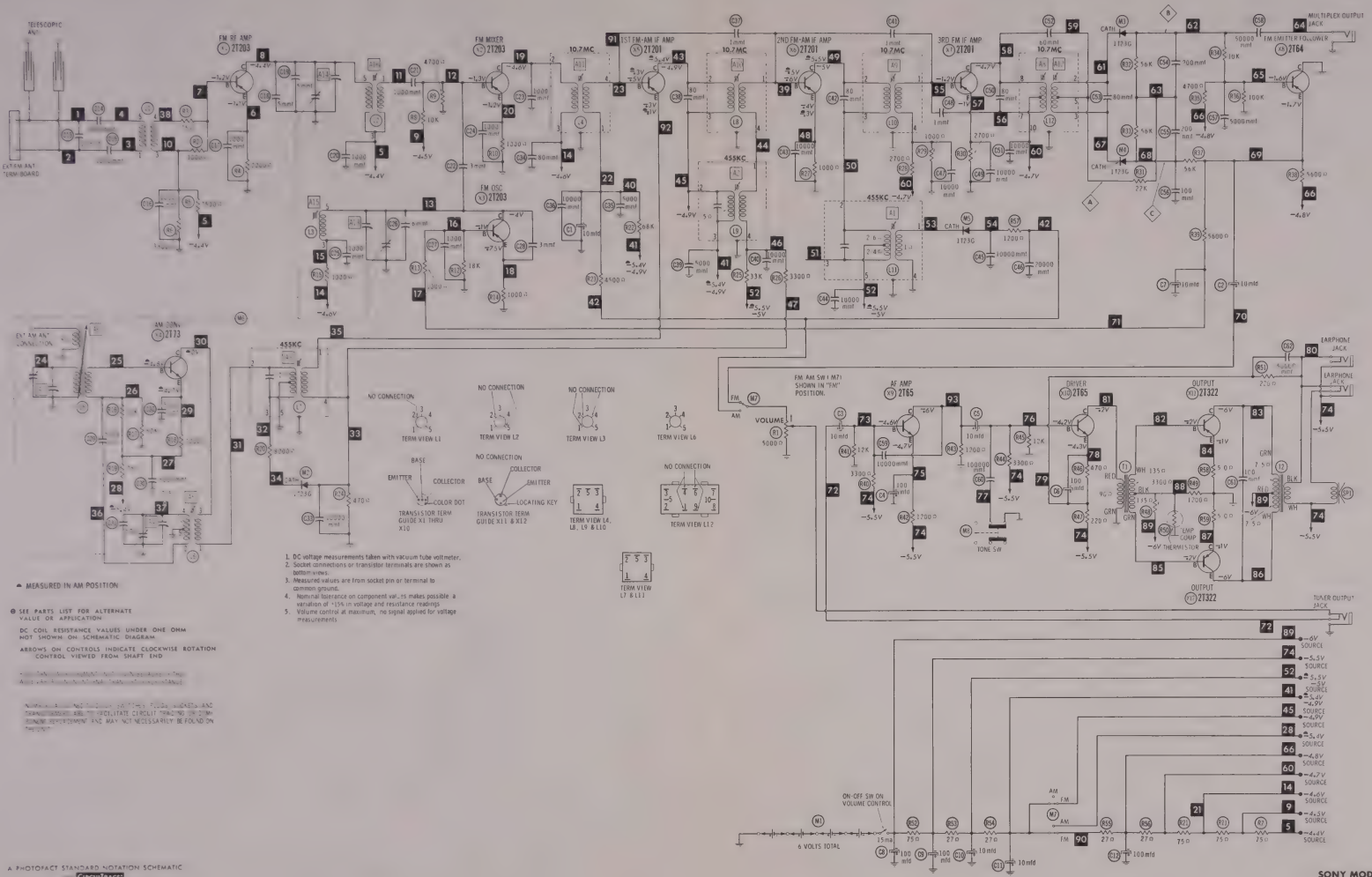
A Howard W. Sams CIRCUITRACE* Photo

PRINTED BOARD



A Howard W. Sams CIRCUITRACE* Photo

PRINTED BOARD


TELESCOPIC ANT.
EXTERN. ANT. TERM. BOARD
FM RF AMP X1 2T203
FM MIXER X2 2T203
FM OSC X3 2T203
1ST FM-AM IF AMP X5 2T201
2ND FM-AM IF AMP X6 2T201
3RD FM IF AMP X7 2T201
10.7 MC
455 KC
MULTIPLEX OUTPUT JACK
TM EMITTER FOLLOWER X4 2T64
EXT. AM ANT. CONNECTION
AM OSC X8 2T73
AM RF AMP X9 2T73
AM MIXER X10 2T73
AM IF AMP X11 2T73
AM DET. AMP X12 2T73
AF AMP X13 2T65
DRIVER X14 2T65
OUTPUT X15 2T322
OUTPUT X16 2T322
EARPHONE JACK
TUNER OUTPUT JACK
FM AM SW I M71 SHOWN IN "FM" POSITION.
VOLUME R1 5000
TONE SW
ON-OFF SW ON VOLUME CONTROL
6 VOLTS TOTAL
SPKR
NO CONNECTION
TERM VIEW L1
TERM VIEW L2
TERM VIEW L3
TERM VIEW L6
TERM VIEW L4, L8, L9 & L10
TERM VIEW L7 & L11
TERM VIEW L12
BASE
EMITTER
COLLECTOR
COLOR DOT
TRANSISTOR TERM GUIDE X11 THRU X10
LOCATING KEY
TRANSISTOR TERM GUIDE X11 & X12
1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings
5. Volume control at maximum, no signal applied for voltage measurements
▲ MEASURED IN AM POSITION
⊕ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION CONTROL VIEWED FROM SHAFT END
A PHOTOFACT STANDARD NOTATION SCHEMATIC
CIRCUITRACE
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SONY MODEL TFM-121

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Suggested Alignment Tools: A1, A2, A3, A8 thru A12 . . GENERAL CEMENT #5004, 5009, 8195, 8274, 8275, 8607, 8728, 8987, 8988, 8989, 9291
WALSCO #2515, 2520, 2522, 2523, 2531, 2532, 2534, 2537, 2538
A4, A7, A13, A14 . . . . . GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528
A5, A15, A16 . . . . . GENERAL CEMENT #9440

AM ALIGNMENT – SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	455KC (400∿ Mod.)	(AM) Tuning gang fully open.	Across voice coil.	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	1600KC	1600KC	"	A4	"
3.	"	600KC	600KC	"	A5, A6	"
4.	"	1400KC	1400KC	"	A7	Adjust for maximum output. Repeat Steps 2, 3 and 4.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM– SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	Across FM antenna terminals.	10.7MC (Unmod.)	(FM) Point of non-interference.	DC probe thru 1meg to point Ⓐ. Common to chassis.	A8, A9, A10, A11	Adjust for maximum deflection.
6.	"	"	"	DC probe to point Ⓑ. Common to point Ⓒ.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE–SELECTOR IN FM POSITION

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	Across FM antenna terminals.	10.7MC (450KC Swp.)	(FM) Point of non-interference.	Vert. amp. thru 47K to point Ⓐ. Low side to chassis.	A8, A9, A10, A11	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
6.	"	"	"	Vert. amp. to point Ⓑ. Low side to chassis.	A12	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A8 for maximum amplitude and straightness of cross-over lines.

FM RF ALIGNMENT – SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	Across FM antenna terminals.	108MC (Unmod.)	(FM) 108MC	DC probe thru 1meg to point Ⓐ. Common to chassis.	A13, A14	Adjust for maximum deflection.
8.	"	88MC	88MC	"	A15, A16	"

FIG. 1

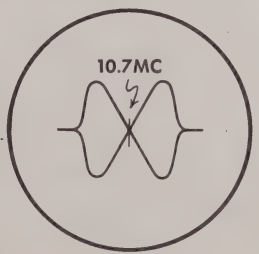
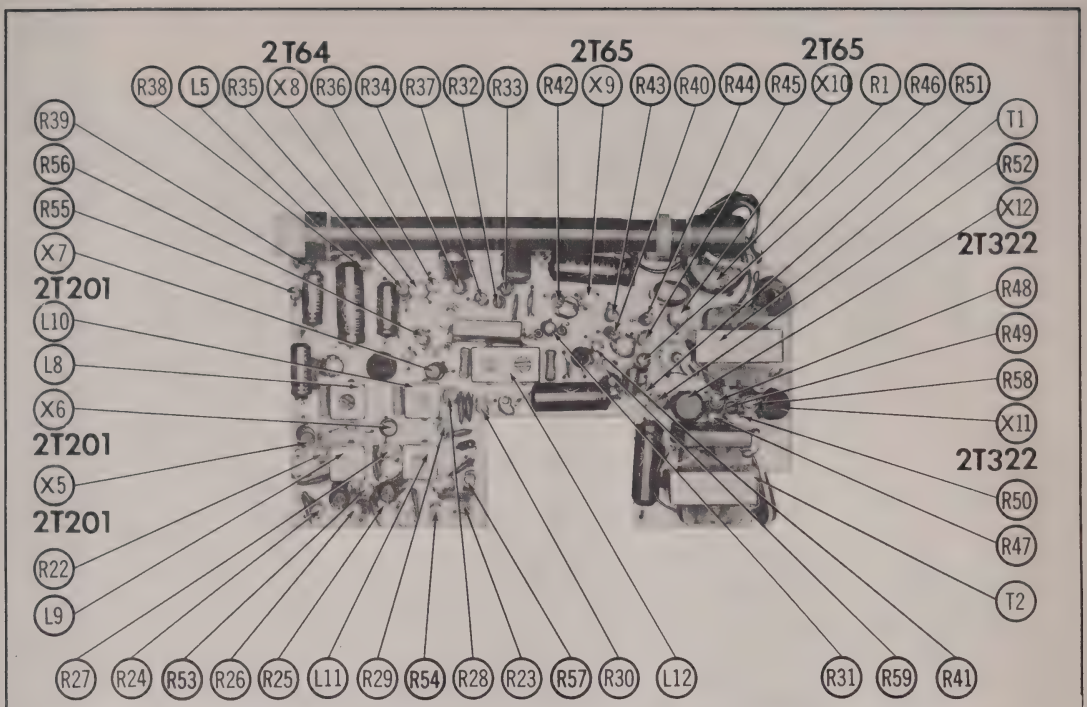
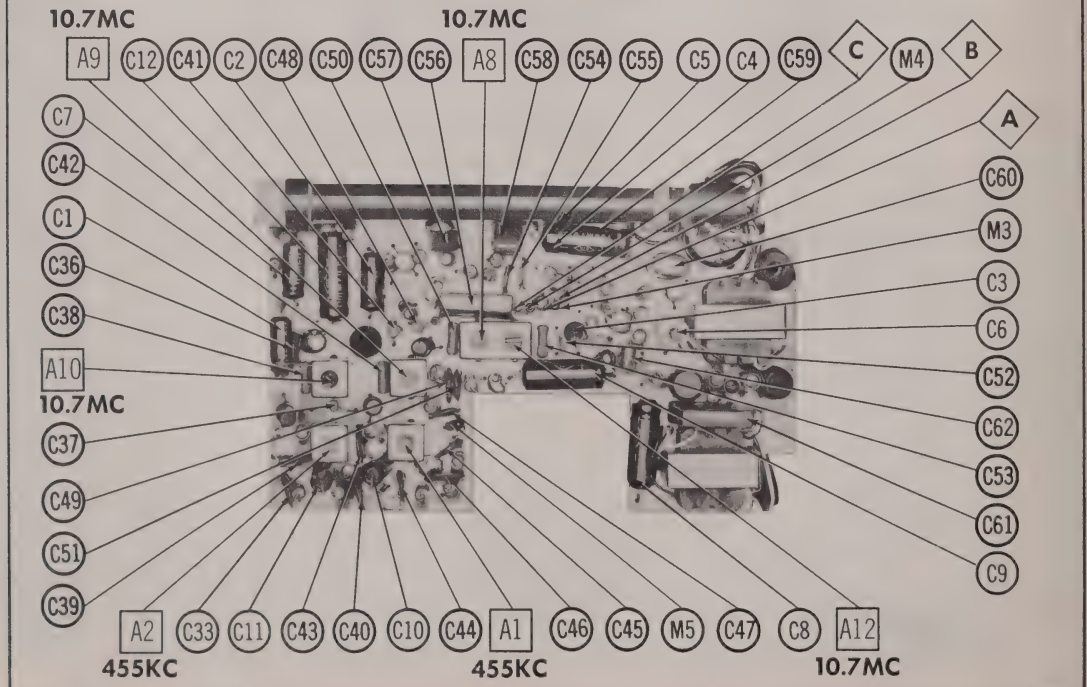


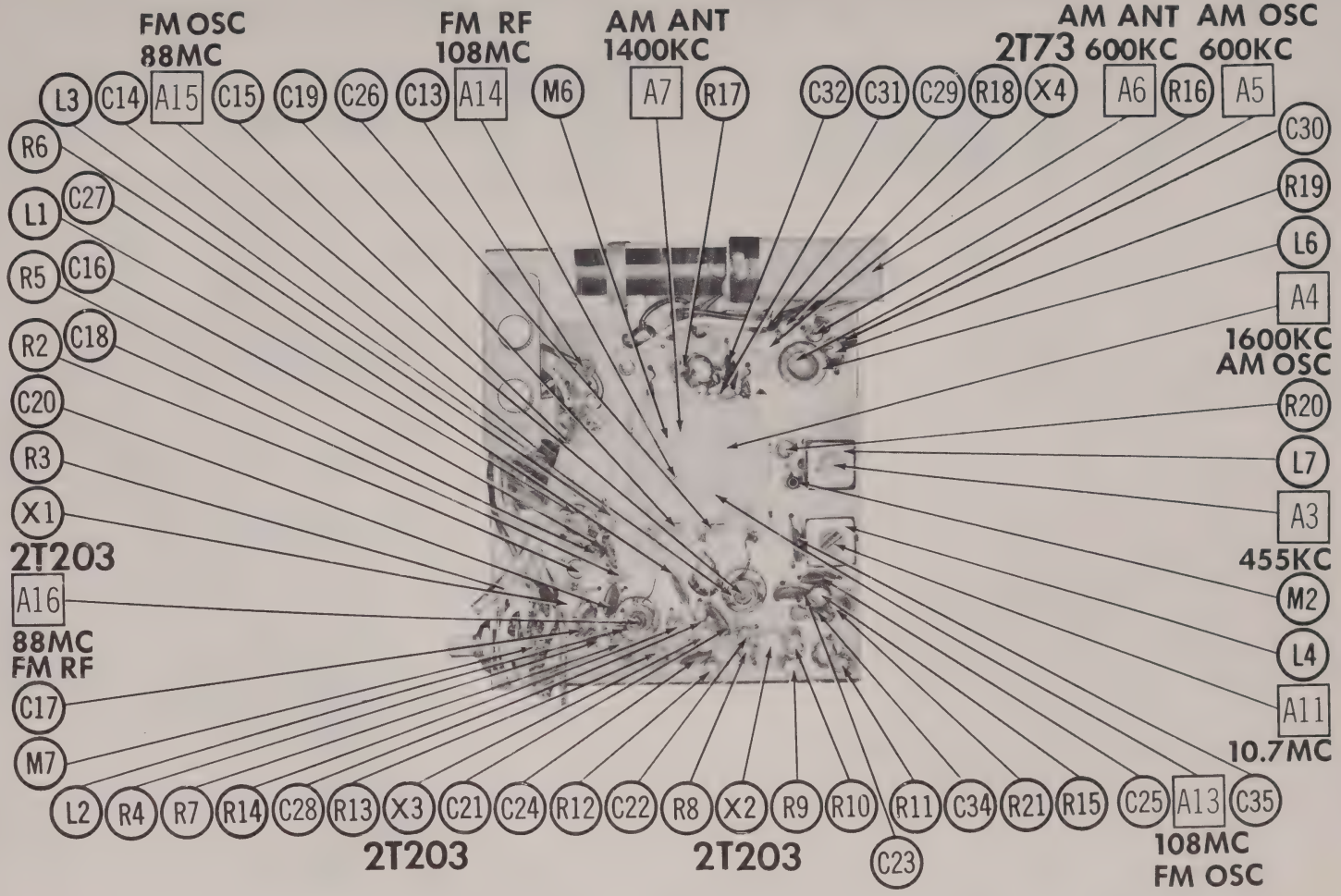
FIG. 2



IF-AUDIO CHASSIS TOP VIEW-RESISTOR, INDUCTOR & TRANSISTOR IDENT.



IF-AUDIO CHASSIS TOP VIEW-ALIGNMENT, CAPACITOR & MISC. IDENT.



RF CHASSIS-TOP VIEW

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2T203	FM RF Amplifier				PNP
X2	2T203	FM Mixer				PNP
X3	2T203	FM Oscillator				PNP
X4	2T73	AM Converter			2N212	NPN
X5	2T201	1st FM-AM IF Amp.				PNP
X6	2T201	2nd FM-AM IF Amp.				PNP
X7	2T201	3rd FM IF Amp.				PNP
X8	2T64	FM Emitter Follower				NPN
X9	2T65	AF Amplifier			2N214	NPN
X10	2T65	Driver			2N214	NPN
X11	2T322	Output				PNP
X12	2T322	Output				PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	SONY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	10	6		PTT-6010	NLW10-6	TT6X10	MLV10-6	TE-1087	
C2	10	6		PTT-6010	NLW10-6	TT6X10	MLV10-6	TE-1087	
C3	10	6		PTT-6010	NLW10-6	TT6X10	MLV10-6	TE-1087	
C4	100	6		PTT-6100	NLW100-12	TT6X100	MLV100-6	TE-1102	
C5	10	6		PTT-6010	NLW10-6	TT6X10	MLV10-6	TE-1087	
C6	100	3		PTT-3100	NLW100-3	TT6X100	MLV100-3	TE-1059, 5	
C7	10	6		PTT-6010	NLW10-6	TT6X10	MLV10-6	TE-1087	
C8	100	6		PTT-6100	NLW100-12	TT6X100	MLV100-6	TE-1102	
C9	100	6		PTT-6100	NLW100-12	TT6X100	MLV100-6	TE-1102	
C10	10	6		PTT-6010	NLW10-6	TT6X10	MLV10-6	TE-1087	
C11	10	6		PTT-6010	NLW10-6	TT6X10	MLV10-6	TE-1087	
C12	100	6		PTT-6100	NLW100-12	TT6X100	MLV100-6	TE-1102	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C13	10		NPO-DI 10	DTZ-10	C10QIC	CCTO-100	CNO-410	10TCC-Q10
C14	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C15	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C16	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C17	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C18	5		NPO-DI 5.0	DTZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C19	5		NPO-DI 5.0	DTZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C20	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C21	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C22	3		NPO-DI 3.0	DTZ-3R3	C10V3C	CCTO-3R3	CNO-533	10TCC-V33
C23	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C24	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C25	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C26	6				C10V6C			
C27	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C28	3		NPO-DI 3.0	DTZ-3R3	C10V3C	CCTO-3R3	CNO-533	10TCC-V33
C29	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C30	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C31	5		NPO-DI 5.0	DTZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C32	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C33	10000		BPD-01	DD6-103	BYA6S1	CCD-103	GP110	5HK-S10
C34	80		SI 82	D6-820	L10Q82	CCD-820	GP482	10TS-Q82
C35	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C36	10000		BPD-01	DD6-103	BYA6S1	CCD-103	GP110	5HK-S10
C37	1		NPO-DI 1.0	TCZ-1				10TCC-V10
C38	80		SI 82	D6-820	L10Q82	CCD-820	GP482	10TS-Q82
C39	10000		BPD-01	DD6-103	BYA6S1	CCD-103	GP110	5HK-S10
C40	10000		BPD-01	DD6-103	BYA6S1	CCD-103	GP110	5HK-S10
C41	1		NPO-DI 1.0	TCZ-1				10TCC-V10
C42	80		SI 80	D6-820	L10Q82	CCD-820	GP482	10TS-Q82
C43	10000		BPD-01	DD6-103	BYA6S1	CCD-103	GP110	5HK-S10
C44	10000		BPD-01	DD6-103	BYA6S1	CCD-103	GP110	5HK-S10
C45	10000		BPD-01	DD6-103	BYA6S1	CCD-103	GP110	5HK-S10
C46	20000		C80V203AM	DA-203	H-05S2	CCD-203	TA-120	TG-S20
C47	10000		BPD-01	DD6-103	BYA6S1	CCD-103	GP110	5HK-S10
C48	1		NPO-DI 1.0	TCZ-1				10TCC-V10
C49	10000		BPD-01	DD6-103	BYA6S1	CCD-103	GP110	5HK-S10
C50	80		SI 82	D6-820	L10Q82	CCD-820	GP482	10TS-Q82
C51	10000		BPD-01	DD6-103	BYA6S1	CCD-103	GP110	5HK-S10
C52	60			TCZ-62	C10Q62C	CM-19B-620M		1FM-462
C53	80		SI 82	D6-820	L10Q82	CCD-820	GP482	10TS-Q82
C54	200		DI-200	DD-201	L10T2	CCD-201	GP320	10TS-T20
C55	200		DI-200	DD-201	L10T2	CCD-201	GP320	10TS-T20
C56	100		DI-100	DD-101	L10T1	CCD-101	GP310	10TS-T10
C57	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C58	50000		C80V503AM	DA-503	H-05S5	IDP-2-503	TA-150	TG-S50
C59	10000		BPD-01	DD6-103	BYA6S1	CCD-103	GP110	5HK-S10
C60	100000		C80V104AM	DA-104	H-05P1	IDP-2-104	TA-010	TG-P10
C61	100		DI-100	DD-101	L10T1	CCD-101	GP310	10TS-T10
C62	50000		C80V503AM	DA-503	H-05S5	IDP-2-503	TA-150	TG-S50

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SONY PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/4	RV-237					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R2	1000Ω				R31	22K			
R3	75Ω				R32	56K			
R4	2200Ω				R33	56K			
R5	7500Ω				R34	10K			
R6	3300Ω				R35	4700Ω			
R7	75Ω				R36	100K			
R8	10K				R37	56K			
R9	4700Ω				R38	5600Ω			
R10	1000Ω				R39	5600Ω			
R11	75Ω				R40	3300Ω			
R12	18K				R41	12K			
R13	1000Ω				R42	1200Ω			
R14	1000Ω				R43	1200Ω			
R15	1000Ω				R44	3300Ω			
R16	10K				R45	12K			
R17	62K				R46	470Ω			
R18	2200Ω				R47	220Ω			
R19	75Ω				R48	3300Ω			
R20	8200Ω				R49	1200Ω			
R21	75Ω				R50	Temp. Comp.			Pt. #S-250
R22	68K				R51	220Ω			
R23	4500Ω				R52	75Ω			
R24	470Ω				R53	27Ω			
R25	33K				R54	27Ω			
R26	3300Ω				R55	27Ω			
R27	1000Ω				R56	27Ω			
R28	2700Ω				R57	1200Ω			
R29	1000Ω				R58	5.0Ω			
R30	2700Ω				R59	5.0Ω			

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		SONY PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	FM Ant.	LA-053-IQ					
L2	FM RF	LH-005					
L3	FM Osc.	LO-039-AQ					
L4	1st FM IF	LI-024-AP					
L5	Loopstick	LA-054-IB					
L6	AM Osc.	LO-002-AQ					
L7	1st AM IF	LI-026-AP					
L8	2nd FM IF	LI-024-BP					
L9	2nd AM IF	LI-026-BP					
L10	3rd FM IF	LI-026-CP					
L11	3rd AM IF	LI-024-CP					
L12	Discriminator	LI-025					

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	SONY PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	.9	1	TI-019					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	SONY PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	150Ω CT	6-8Ω	TX-023					

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SONY PART No.	QUAM PART No.	
SP1	3"x 5"	PM	6-8Ω	DS-017		

PARTS LIST AND DESCRIPTIONS (Continued)

BATTERIES

ITEM No.	VOLTAGE	SONY PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	1.5V			130 *		635 *		M-14R *	* 4 Required

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		SONY PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1T23G			1N60	1N60	Overload (Pigtail)
M3	1T23G			1N60	1N60	FM Det. (Pigtail)
M4	1T23G			1N60	1N60	FM Det. (Pigtail)
M5	1T23G			1N60	1N60	AM Det. (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	SONY PART No.	NOTES
M6	Tuning Cap.	CV-028	2 Gang
M7	Switch	SB-12120	Bandswitch (Rotary Wafer Type)
M8	Switch	SB-12121	Tone (Slide Type DPDT)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	052-027	Volume
Knob	052-023	Tuning
Knob	052-024	Tuning
Knob	052-026	Bandswitch
Dial Pointer	052-029	
Dial Scale	052-003	
Handle	052-015	
Cabinet	052-001	Includes Back
Cabinet Back	052-002	

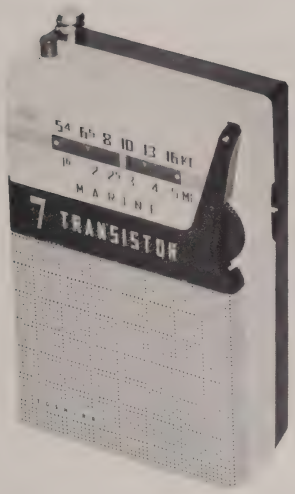
WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

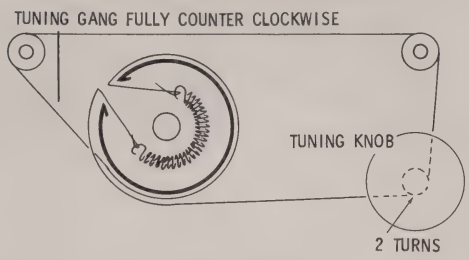
PHOTOFACT® Folder with CIRCUITRACE®

TOSHIBA MODEL 7TP-352M

TOSHIBA MODEL 7TP-352M



DIAL CORD STRINGING



FRONT VIEW

TRADE NAME	Toshiba Model 7TP-352M
IMPORTER	Transistor World Corp., 52 Broadway, New York 4, N. Y.
TYPE SET	Battery Operated Transistorized Portable BC-SW Receiver
POWER SUPPLY	9 Volts DC RATING 7MA @ 9 Volts DC (No Signal, Min. Volume)
TUNING RANGE—BROADCAST	540 – 1600KC 15MA @ 9 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2, A3, A5...GENERAL CEMENT #5004, 5009, 8195, 8274, 8275, 8607, 8728, 8987, 8988, 8989, 9291
WALSCO #2515, 2520, 2522, 2523, 2531, 2532, 2534, 2537, 2538
A4, A6..... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	455KC (400~ Mod.)	(BC) Tuning gang fully open.	Across voice coil.	A1, A2 A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	1600KC	1600KC	"	A4	"
3.	"	600KC	600KC	"	A5	"
4.	"	1400KC	1400KC Signal.	"	A6	"
5.	Place loop near dipole antenna.	5MC	(MR) 5MC	"	A7	Adjust for maximum output.
6.	"	4MC	4MC	"	A8	"
7.	"	2MC	2MC	"	A9	Adjust for maximum output. Repeat Steps 2 thru 7.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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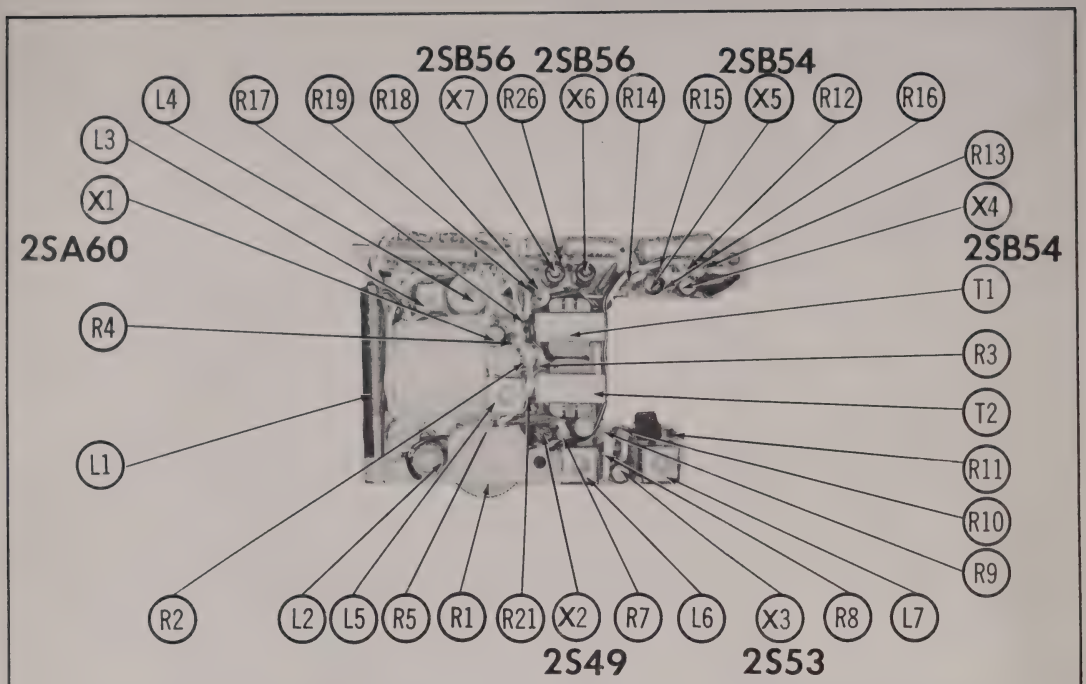
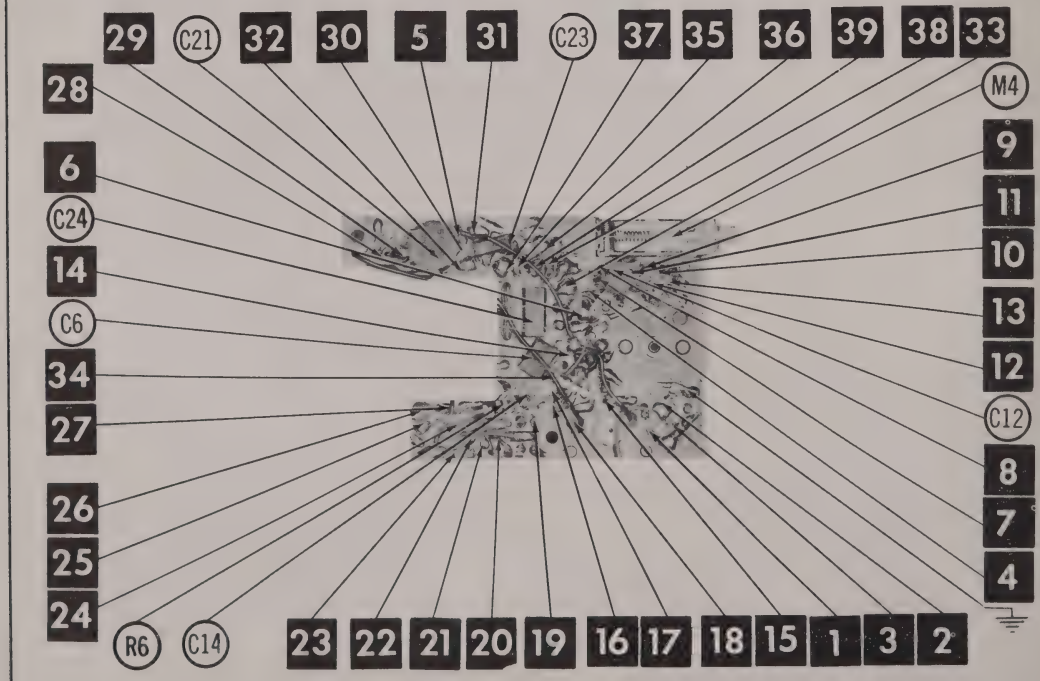
KF517

SET 533 FOLDER 14



CHASSIS TOP VIEW-RESISTOR, INDUCTOR & TRANSISTOR IDENT.



A Howard W. Sams CIRCUITRACE® Photo

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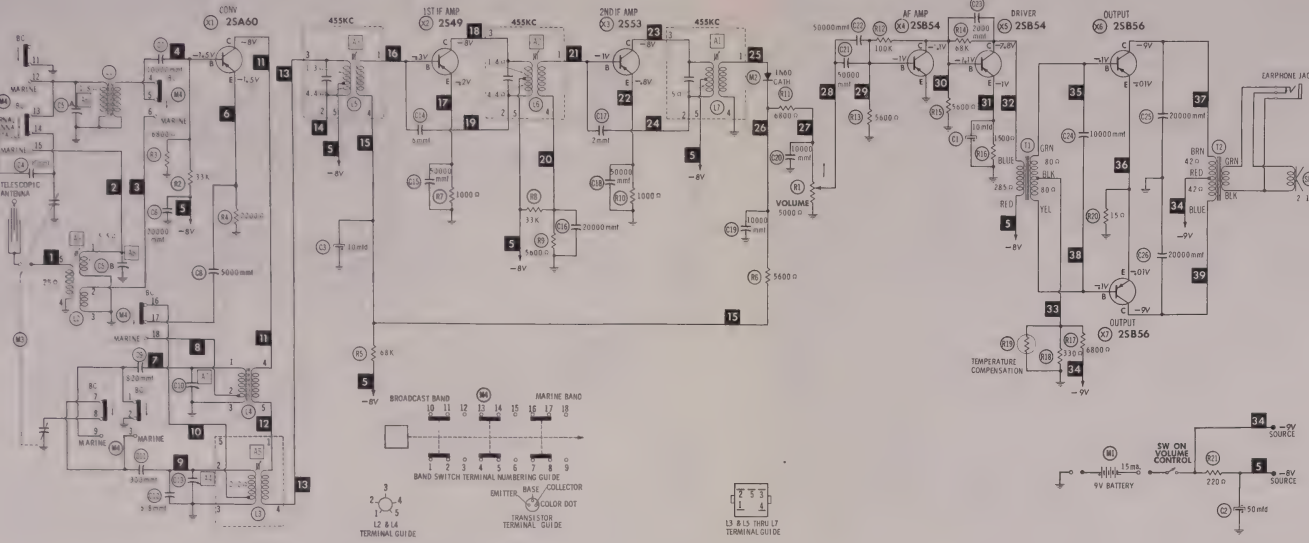

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
CircuiTrace
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TOSHIBA MODEL 7TP-352M

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2SA60	Converter				PNP
X2	2S49	1st IF Amplifier	2N410	2N483		PNP
X3	2S53	2nd IF Amplifier	2N410	2N483	2N410	PNP
X4	2SB54	AF Amplifier	2N406			PNP
X5	2SB54	Driver	2N406			PNP
X6	2SB56	Output	2N408			PNP
X7	2SB56	Output	2N408			PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	TOSHIBA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	10	3		PTT-3010	NLW10-6	TT3X10	MLV10-3	TE-1053	
C2	50	10		PTT-10050	NLW50-10	TT10X50	MLV50-10	TE-1119	
C3	10	3		PTT-3010	NLW10-6	TT3X10	MLV10-3	TE-1053	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C4	5		NPO-DI 5.0	DTZ-4R7	C10V5C	CCTO-050	CNO-550	10TCC-V50
C5A B								
C6	20000		C80V203AM	DA-203	H-05S2		TA-120	TG-S20
C7	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10
C8	5000		C80V502AM	DM-502	H-05D5	CCD-502	TA-250	TG-D50
C9	820		SI 820	D6-821	L10T82	CCD-821	GP382	10TS-T82
C10								
C11	300		SI 300	D6-301	L10T3	CCD-301	GP330	10TS-T30
C12	6.8		NPO-DI 6.8	DTZ-6R8	C10V68C		CNO-568	10TCC-V68
C13								
C14	6			DD-060	C10V6C			
C15	50000		C80V503AM	DA-503	H-05S5		TA-150	TG-S50
C16	20000		C80V203AM	DA-203	H-05S2		TA-120	TG-S20
C17	2		NPO-DI 2.2	DTZ-2R2	C10V2C	CCTO-2R2	CNO-522	10TCC-V22
C18	50000		C80V503AM	DA-503	H-05S5		TA-150	TG-S50
C19	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10
C20	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10
C21	50000		C80V503AM	DA-503	H-05S5		TA-150	TG-S50
C22	50000		C80V503AM	DA-503	H-05S5		TA-150	TG-S50

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C23	2000		BPD-002	DM-202	BYA10D2	CCD-202	GP220	5HK-D20
C24	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10
C25	20000		C80V203AM	DA-203	H-05S2		TA-120	TG-S20
C26	20000		C80V203AM	DA-203	H-05S2		TA-120	TG-S20

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TOSHIBA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/10						Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R2	33K				R12	100K			
R3	6800Ω				R13	5600Ω			
R4	2200Ω				R14	68K			
R5	68K				R15	5600Ω			
R6	5600Ω				R16	1500Ω			
R7	1000Ω				R17	6800Ω			
R8	33K				R18	330Ω			
R9	5600Ω				R19	Temp. Comp.			
R10	1000Ω				R20	15Ω			
R11	6800Ω				R21	220Ω			

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		TOSHIBA PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	Loopstick	20371					
L2	SW Ant.	20410/222					
L3	BC Osc.	153A					
L4	SW Osc.	163					
L5	1st IF	1038					
L6	2nd IF	1039					
L7	3rd IF	1040					

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	TOSHIBA PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3.5	1	0617A					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	TOSHIBA PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	500Ω CT	6-8Ω	0679A			TR-102①		① Use 8Ω Tap.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	TOSHIBA PART No.	QUAM PART No.	
SP1	2½"	PM	6-8Ω	50113		

BATTERIES

ITEM No.	VOLTAGE	TOSHIBA PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V	R006		P6		226		M-1600	

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		TOSHIBA PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N60			1N60	1N60	Detector (Pigtail)

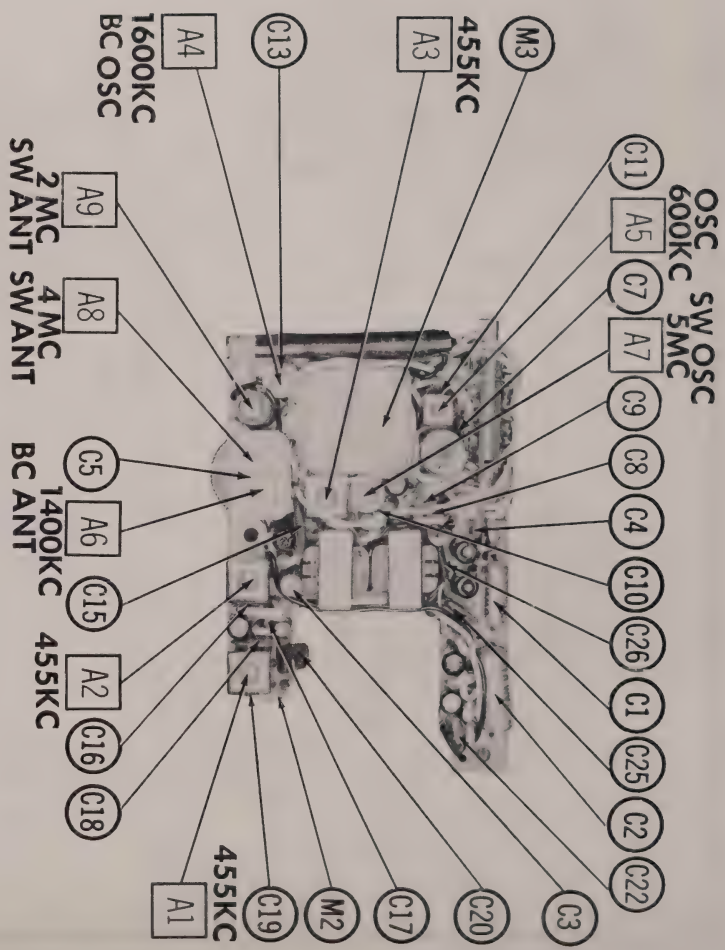
MISCELLANEOUS

ITEM No.	PART NAME	TOSHIBA PART No.	NOTES
M3	Tuning Cap.	30504	2 Gang
M4	Switch		Band Selector (Slide Type)

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT® Folder

**VOCALINE MODELS
JRC-400, JRC-425**

VOCALINE MODELS
JRC-400, JRC-425

MODEL JRC-425

VOCALINE MODELS
JRC-400, JRC-425

TRADE NAME	Vocaline Models JRC-400, JRC-425
MANUFACTURER	Vocaline Company of America, Inc., Old Saybrook, Connecticut
TYPE SET	AC-Battery Operated Single Channel 3 Tube Citizens Band Transmitter-Receiver
POWER SUPPLY	110-120 Volts AC, 60 Cycles (or) 6 Volt Storage Battery
RATING	16 Watts, .2 Amp. @117 Volts AC (Receive), 20 Watts, .34 Amp. @117 Volts AC (Transmitt) 3.3 Amp. @6.3 Volts DC
TUNING RANGE	465 MC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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KZ439

SET 533 FOLDER 15

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (GENERAL ELECTRIC • RAYTHEON • SYLVANIA)
V1	Superregenerative Det. - Trans. Osc.	6AF4A
V2	AF Amp. -Speech Amp.	6AV6
V3	Output-Modulator	6AS5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	VOCALINE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■40	150		AFH3-10	C0090	FP311.5	TMT-3127	TVL-3442	
B	▲40	150							
C	40	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	.5-3			829-3		CV-1		
C3	100 5%		1469-0001	TCZ-100	22R5T1	CM-19B-101J	MCE235	MS-31
C4	150 5%		1469-00015	TCZ-150	22R5T15	CM-19B-151J	MCE236	MS-315
C5	1000		EF-001	MFT-1000		CCF-102	CT280A	
C6	2000		BPD-002	DD-202	BYA10D2	CCD-220	B-220	5HK-D20
C7	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C8	2000		BPD-002	DD-202	BYA10D2	CCD-220	B-220	5HK-D20
C9	2000		BPD-002	DD-202	BYA10D2	CCD-220	B-220	5HK-D20
C10	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C11	.05 1000V		P1088N-05		CUBI0S5	16DP-5-503	GEM-1015	10TM-S50
C12	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA VOCALINE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	PE013-WT	B-59	A47-500K-S	Q11-133	U50	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			KR-1	SWE-12	76-1	US-26	Power Off-On

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

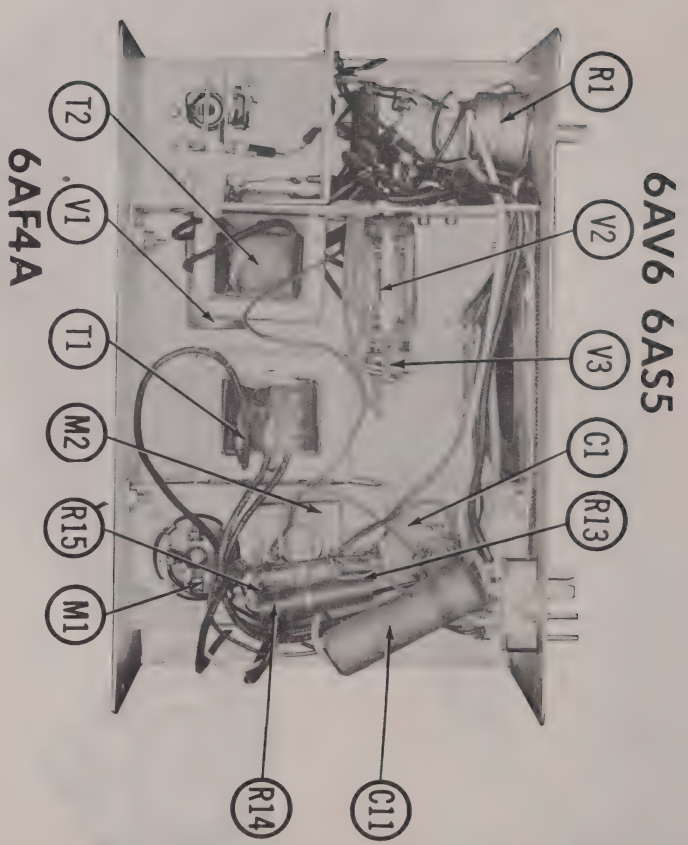
ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R2	10K			
R3	470Ω			
R4	270K			
R5	150Ω			
R6	22K			
R7	470Ω			
R8	150Ω			

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R9	470Ω			
R10	150Ω			
R11	22K			
R12	100K			
R13	2200Ω			
R14	220Ω 2W			
R15	15Ω			

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	VOCALINE PART No.	REPLACEMENT DATA
K1	Audio Coupling	220mmf, 250mmf, 2000mmf, 5000mmf, 470K, 470K, 6.8meg		Aerovox PA-113-1 Centralab PC-150 Sprague DT-1

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		VOCALINE PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	Ant.						① IRC Part #CLA
L2	RF Choke (.47uh)	①		4588	RTC-8513	T958	
L3	Osc.						
L4	Fil. Choke (.47uh)	①		4588	RTC-8513	T958	
L5	Fil. Choke (.47uh)	①		4588	RTC-8513	T958	

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	VOCALINE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	6.3VCT* @ 2A	120V @* .065A		504K1					* DC Operation. † AC Operation.
	117V @ † .8A	6.3V @ † 1.3A							

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	VOCALINE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	2300Ω	3-4Ω	PE 023		A-3876			

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	VOCALINE PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	V4B33	4A07	

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				VOCALINE PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	6V	115∿		5301	1601	5301	

POWER RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	VOCALINE PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M2	.065A	♦	1N1763 *	100A ♦	SR500 *	♦ Selenium * Silicon (Use Surge Limiter)

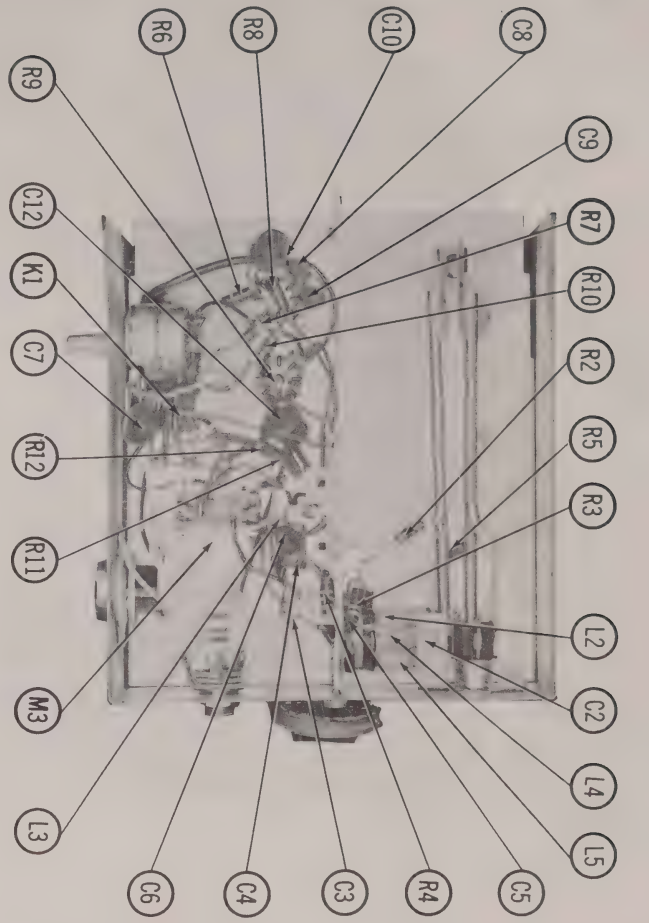
MISCELLANEOUS

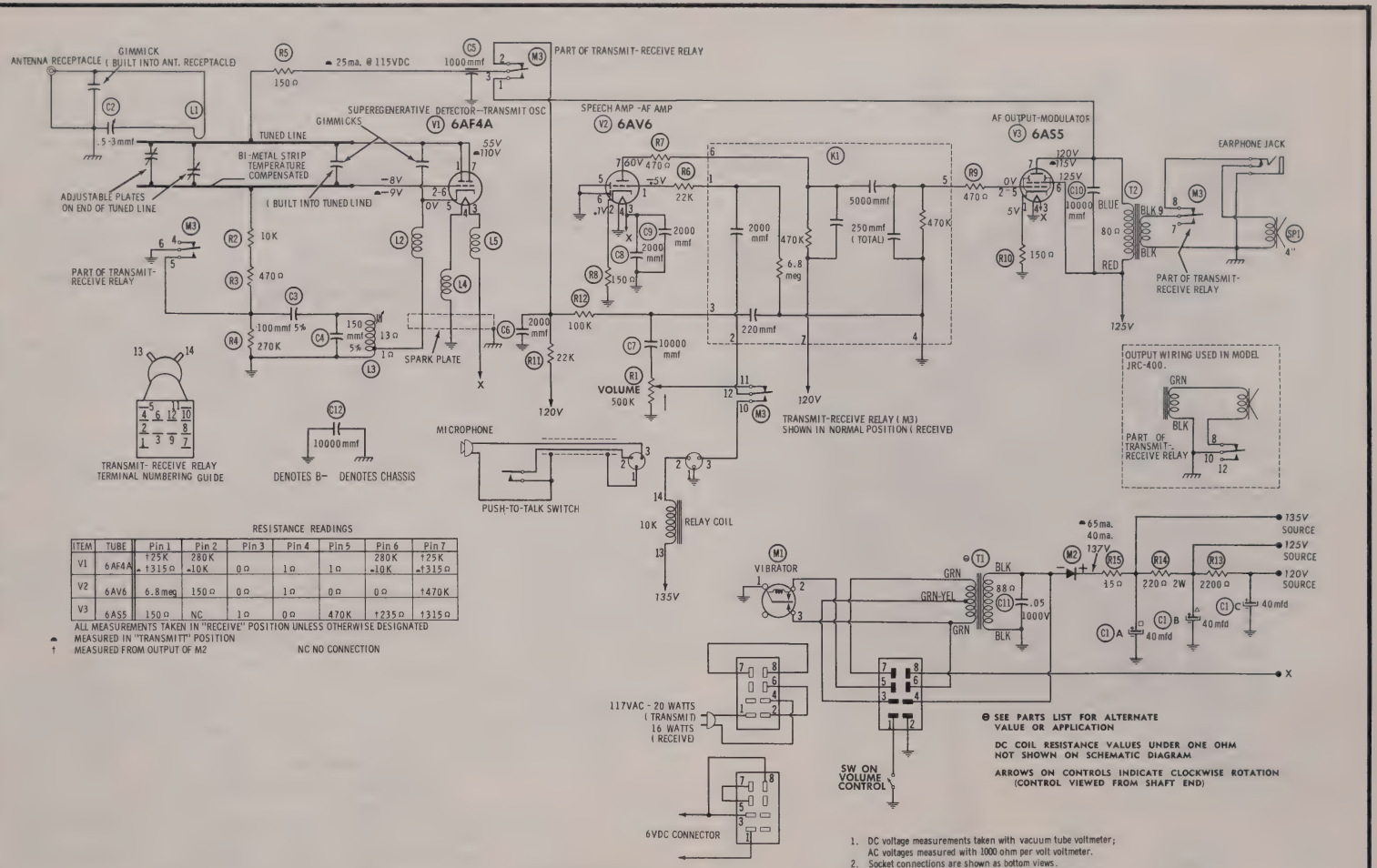
ITEM No.	PART NAME	VOCALINE PART No.	NOTES
M3	Relay		Switching

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	6AF4A	†25K ▰ †315Ω	280K ▰10K	0Ω	1Ω	1Ω	280K ▰10K	†25K ▰†315Ω
V2	6AV6	6.8meg	150Ω	0Ω	1Ω	0Ω	0Ω	†470K
V3	6AS5	150Ω	NC	1Ω	0Ω	470K	†235Ω	†315Ω

ALL MEASUREMENTS TAKEN IN "RECEIVE" POSITION UNLESS OTHERWISE DESIGNATED
▰ MEASURED IN "TRANSMITT" POSITION
† MEASURED FROM OUTPUT OF M2
NC NO CONNECTION

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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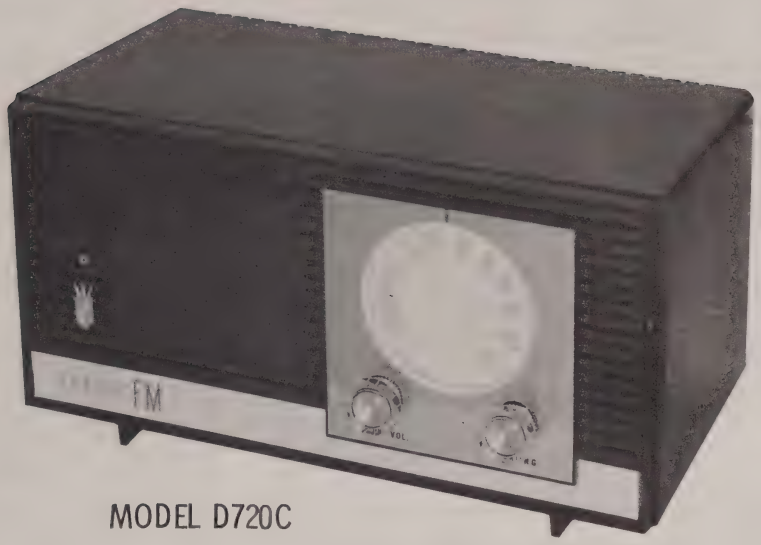
VOCALINE MODELS JRC-400, JRC-425

PHOTOFACT® Folder

ZENITH MODELS
D720C, P (Ch. 6D01)

ZENITH MODELS
D720C, P (Ch. 6D01)

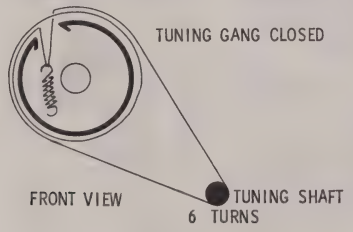


MODEL D720C

ZENITH MODELS
D720C, P (Ch. 6D01)

TRADE NAME	Zenith Models D720C, D720P (Ch. 6D01)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET	AC-DC Operated 6 Tube FM Receiver
POWER SUPPLY	110 — 120 Volts AC-DC
TUNING RANGE—FREQ. MOD.	88 — 108MC RATING 32 Watts, .35 Amp. @117 Volts AC

TUNING DRIVE CORD STRINGING



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The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1961 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

KI236

SET 533 FOLDER 16

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.
Suggested Alignment Tools: A1 thru A6...GENERAL CEMENT # 8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545

IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100K (±1%) resistors in series from point (A) to chassis. The junction of these two resistors is alignment point (C) as shown on the schematic.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .01mfd to pin 2 (grid) of Mixer. Low side to chassis.	10.7MC (Unmod.)	Point of non-interference.	DC probe to point (A). Common to chassis.	A1, A2, A3, A4, A5	Adjust for maximum deflection.
2.	"	"	"	DC probe to point (B). Common to point (C).	A6	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

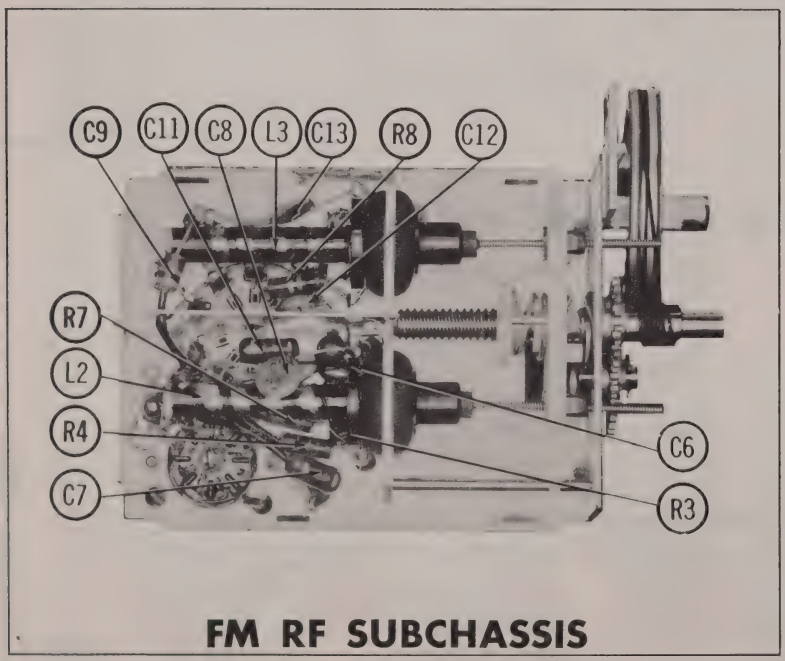
IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1.	High side thru .01mfd to pin 2 (grid) of Mixer. Low side to chassis.	10.7MC (450KC Swp)	Point of non-interference.	Vert. amp. to point (A). Low side to chassis.	A1, A2, A3, A4, A5	Disconnect stabilizing Capacitor C2. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C2.
2.	"	"	"	Vert. amp. to point (B). Low side to chassis.	A6	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A1 for maximum amplitude and straightness of cross-over lines.

RF ALIGNMENT

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
3.	Across antenna terminals with 270Ω in high side.	98MC (Unmod.)	98MC	DC probe to point (A). Common to chassis.	A7, A8	Adjust for maximum deflection.



FM RF SUBCHASSIS

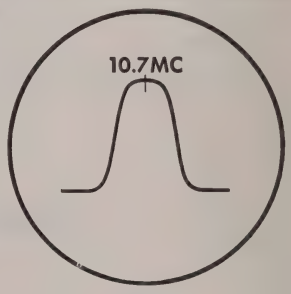


FIG. 1

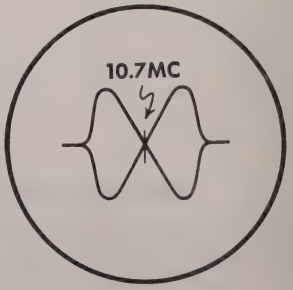
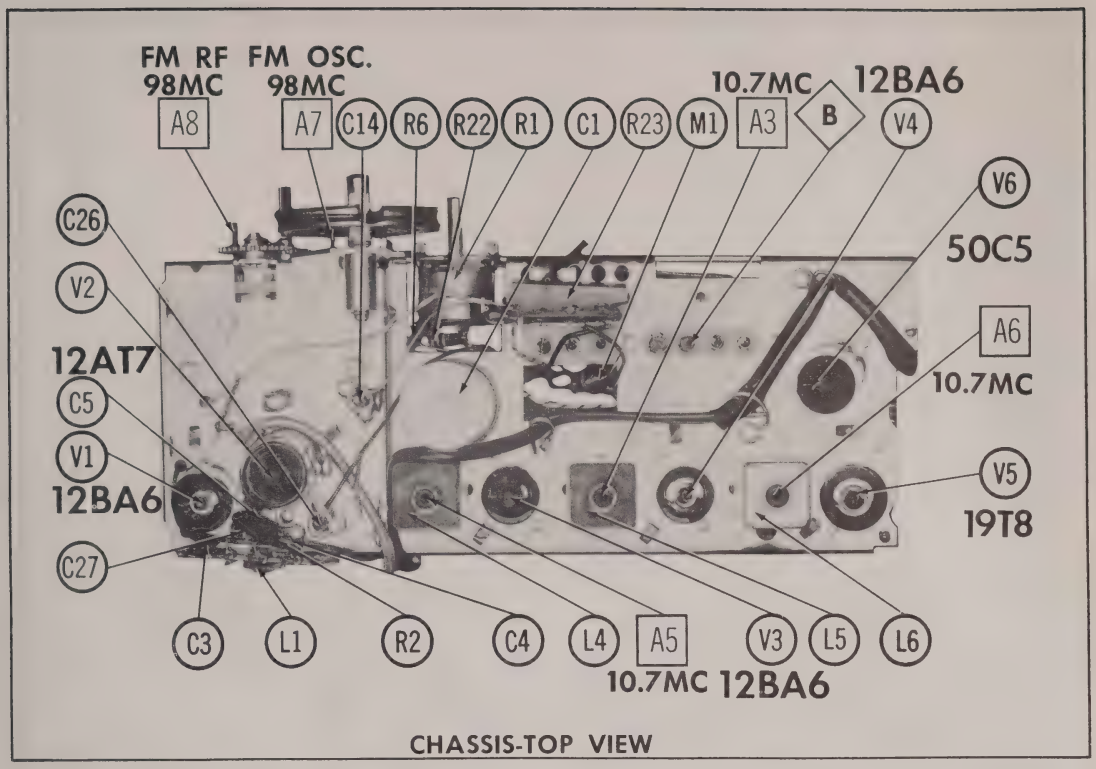
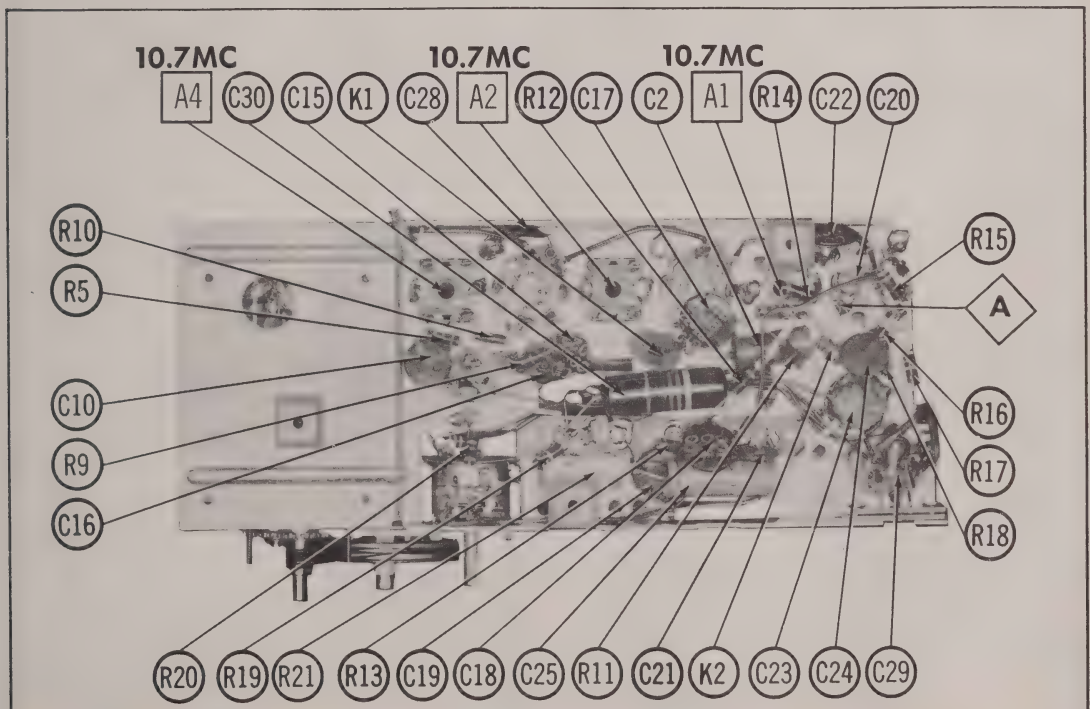


FIG. 2



CHASSIS-TOP VIEW



CHASSIS-BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES

◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	RF Amplifier	12BA6	V4	2nd IF Amplifier	12BA6
V2	Mixer-Osc.	12AT7	V5	Ratio Det. -AF Amp.	19T8
V3	1st IF Amplifier	12BA6	V6	Output	50C5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	80	150	22-3056	AFH2-19	XB0181	FP216.2	TMD-2135	TVL-2442.1	
B	40	150							
C2	5	50	22-2941	SRE50V5	BBR5-50	TC30	TD-5-50	TVA-1303	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	15 N330 10%			TCA-15		*		10TCS-Q15
C4	15 N330 10%			TCA-15		*		10TCS-Q15
C5	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C6	1000		SI-1000	D6-102	BYA10D1	CCD-102	B-210	5HK-D10
C7	1000		SI-1000	D6-102	BYA10D1	CCD-102	B-210	5HK-D10
C8	24 N75 5%	#22-2382						
C9	.68		NPO-SI .68	TCZ-R68				
C10	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C11	1000		SI-1000	D6-102	BYA10D1	CCD-102	B-210	5HK-D10
C12	50		DI-50	DD-500	L10Q5	CCD-500	GP450	10TS-Q50
C13	24 N75 5%	#22-2382						
C14	1000		EF-001	MFT-1000		CCF-102	CT280A	
C15	2200 10%		DI-2200			CCD-222	GP222	10TS-D22
C16	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C17	2200 10%		DI-2200			CCD-222	GP222	10TS-D22
C18	100		DI-100	DD-101	L10T1	CCD-101	GP310	10TS-T10
C19	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C20	6.8 NPO ± .5mmf		NPO-DI 6.8	DTZ-6R8	C10V68C	CCTO-6R8	CNO-568	10TCC-V68
C21	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C22	100		DI-100	DD-101	L10T1	CCD-101	GP310	10TS-T10

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C23	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C24	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C25	.15 200V		P288N-15		CUB2P15	2DP-3-154	GEM-2015	2TM-P15
C26	1000		EF-001	MFT-1000		CCF-102	CT280A	
C27	1000		EF-001	MFT-1000		CCF-102	CT280A	
C28	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C29A	10000		BPD-2X01	DD3-103	BYA10S1	CCD-103	B-110	5HK-2S10
B	10000				BYA10S1	CCD-103	B-110	
C30	.047 600V	Note 1	P688N-047		CUB6S47	6DP-3-473	GEM-6147	6TM-S47

Zenith Part Number.
Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	1meg	½	63-4658					Volume
B	Shaft							
C	Switch							Power Off-On

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R2	2.2meg				R13	47K			
R3	220Ω				R14	1meg			
R4	220Ω				R15	4.7meg			
R5	220Ω				R16	470K			
R6	1000Ω				R17	470K			
R7	2200Ω				R18	150Ω			
R8	10K				R19	560Ω			
R9	220Ω				R20	820Ω			
R10	100Ω				R21	33Ω 2W			Note 1
R11	220Ω				R22	470K			
R12	27Ω				R23	700Ω 4W	PW5-700	5W-SQ-700	

Note 1. Not used in some versions.

PARTS LIST AND DESCRIPTIONS (Continued)

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ZENITH PART No.	REPLACEMENT DATA
K1	Limiter Grid Filter	25mmf, 100K	105-42	Sprague PRC-11
K2	Stabilizing Net.	1500mmf, 22K	105-45	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		ZENITH PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	Ant. (luh)	20-764	BC-561	4602	RTC-8515	T855	
L2	RF	S-13871					
L3	Osc.	S-15691					
L4	1st IF	95-1705		1463-PC	RTC-9046	T654	
L5	2nd IF	95-1705		1463-PC	RTC-9046	T654	
L6	Ratio Detector	95-1706		1465-PC	RTC-9053	T659	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	ZENITH PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2000Ω	3-4Ω	(Part of SP1)	A-3025	A-3332	24S53	S-12X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ZENITH PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	49-911 *	4R07 ‡	* Includes T1. ‡ Trim one corner to fit.

POWER RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	ZENITH PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.095A	212-26 *	1N1763 *	2F4 *	SR200 *	* Silicon

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
	Tuning Shaft & Pulley Assy.	S-47980	
	Gear & Bushing Assy.	S-47979	
	Drive Shaft & Gear Assy.	S-47981	
	Tuning Core	80-1340	
	Tension Spring		

CABINETS & CABINET PARTS

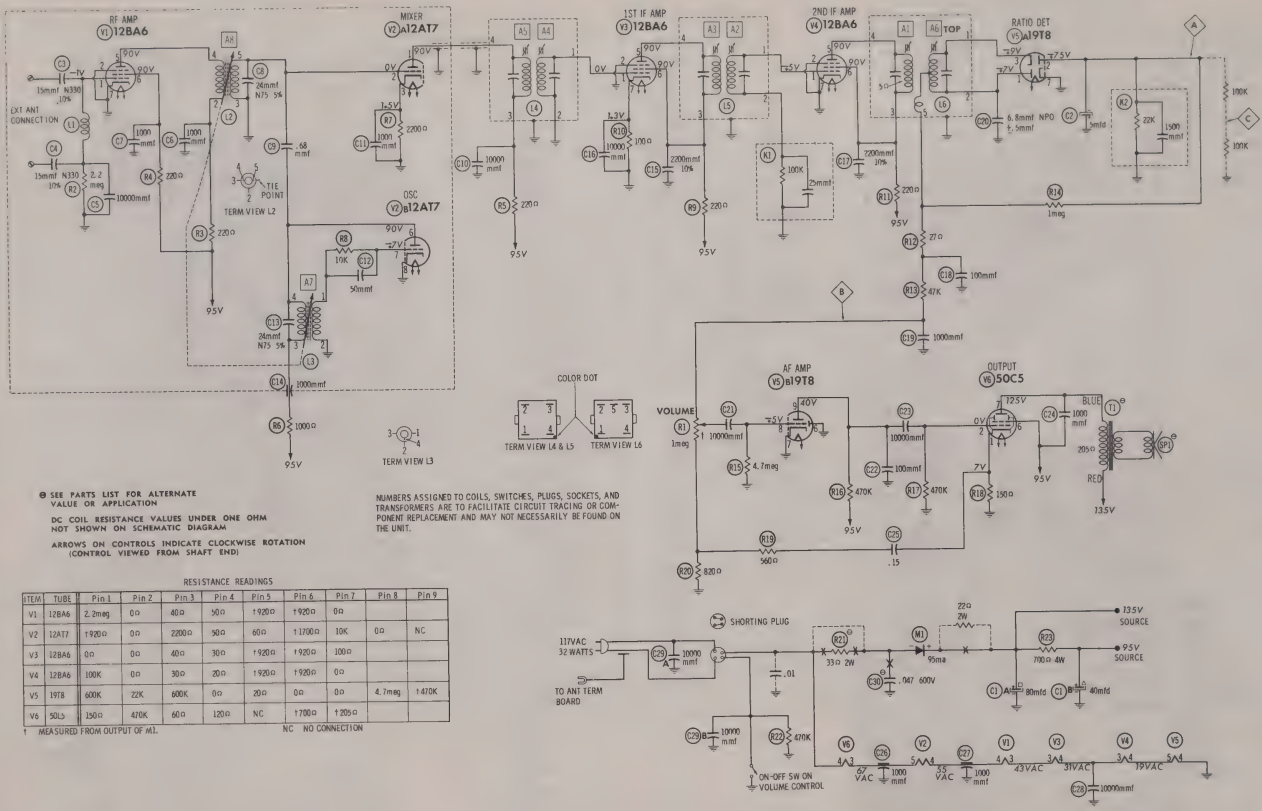
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial Scale	S-48012	Includes Ring Assembly
Knob	S-48010	Tuning, With Spring Assembly
Knob	S-48011	Volume, With Spring Assembly
Cabinet	14-2882	Plastic, Model D720C
Cabinet	14-2883	Plastic, Model D720P

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12BA6	2.2meg	0Ω	40Ω	50Ω	†920Ω	†920Ω	0Ω		
V2	12AT7	†920Ω	0Ω	2200Ω	50Ω	60Ω	†1700Ω	10K	0Ω	NC
V3	12BA6	0Ω	0Ω	40Ω	30Ω	†920Ω	†920Ω	100Ω		
V4	12BA6	100K	0Ω	30Ω	20Ω	†920Ω	†920Ω	0Ω		
V5	19T8	600K	22K	600K	0Ω	20Ω	0Ω	0Ω	4.7meg	†470K
V6	50L6	150Ω	470K	60Ω	120Ω	NC	†700Ω	†205Ω		

† MEASURED FROM OUTPUT OF M1. NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±5% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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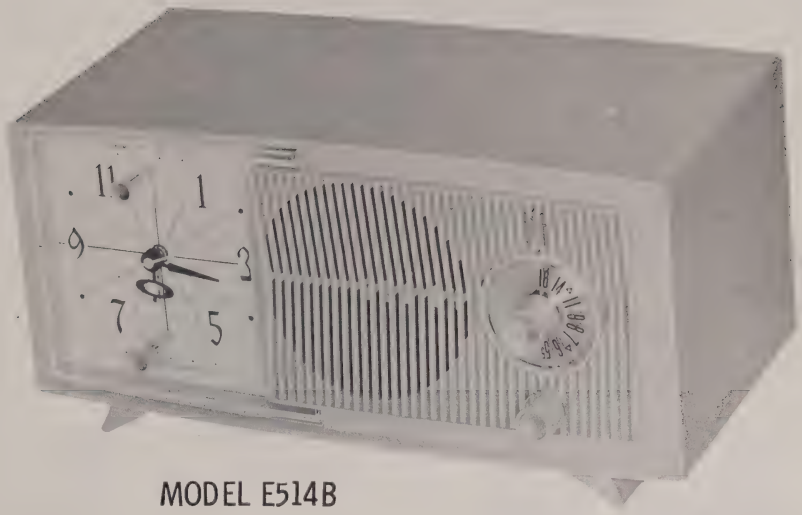
ZENITH MODELS D720C, P (Ch. 6D01)

PHOTOFACT® Folder

ZENITH MODELS
E514B, L, V, W (Ch. 5E04)

ZENITH MODELS
E514B, L, V, W (Ch. 5E04)



MODEL E514B

ZENITH MODELS
E514B, L, V, W (Ch. 5E04)

TRADE NAME	Zenith Models E514B, E514L, E514V, E514W (Ch. 5E04)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET	AC Operated 5 Tube AM Receiver With Electric Clock
POWERSUPPLY	110 - 120 Volts AC, 60 Cycles RATING 26 Watts, .26 Amp. @117 Volts AC (Less Clock)
TUNING RANGE—BROADCAST	540 — 1600KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1 Thru A4 and A7... GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545
A5, A6..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of Converter. Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	Loop	1600KC	1600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	1400KC	1400KC Signal.	"	A6	"
4.	"	600KC	600KC	"	A7	Adjust for maximum output. Repeat Steps 2, 3 and 4.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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KG252

SET 533 FOLDER 17

PARTS LIST AND DESCRIPTIONS

TUBES

• GENERAL ELECTRIC • RAYTHEON • SYLVANIA •

ITEM No.	USE	TYPE
V1	Converter	12BE6
V2	IF Amplifier	12BA6
V3	Det. -AVC-AF Amp.	12AV6
V4	Output	50C5
V5	Rectifier	35W4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■80	150	22-3056	PWH2-17-50	B0180	FP216.2	TMD-2135	TVL-2442.1	
B	▲40	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C3	100		DI-100	DD-101	L10T1	CCD-101	GP310	10TS-T10
C4	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C5	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	63-4673	B-59	A47-500K-S	Q11-133	U50	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R2	22K			Note 1
R3	220Ω			
R4	100Ω			

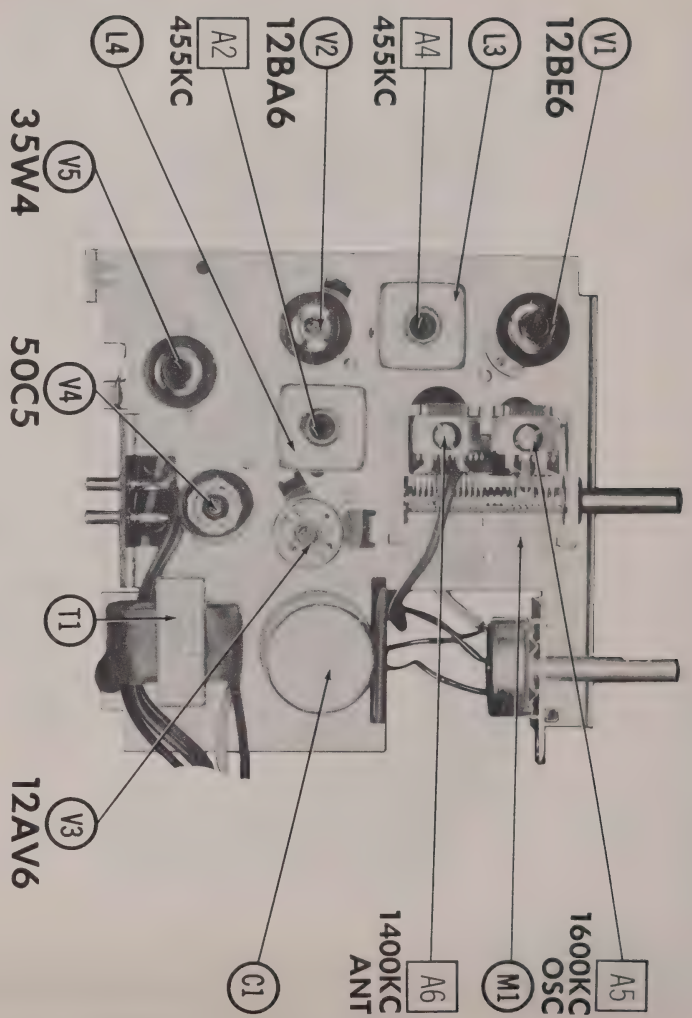
ITEM No.	RATING	REPLACEMENT DATA IRC PART No.	WORKMAN TV PART No.	REMARKS
R5	2.2meg			
R6	150Ω			
R7	1000Ω 1W			

Note 1. Not used in some versions.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ZENITH PART No.	REPLACEMENT DATA	
K1	Audio Coupling	220mmf, 250mmf, 5000mmf, 5000mmf, 470K, 470K, 6.8meg	105-43	Aerovox	PA113-2
				Centralab	PC-151
				Cornell-Dubilier	116TM2
				Mallory	MS-107
				Sprague	DT-2

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		ZENITH PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman TV PART No.	
L1	Loop Ant.	S-48187					
L2	Osc.	S-48159	BC-394	67-OSC	RTC-8648		
L3	1st IF	95-1718	BC-356	13-PC1	RTC-8641	T614	
L4	2nd IF	95-1719	BC-357	13-PC2	RTC-8642	T615	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	ZENITH PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2600Ω Tap@ 3%	3-4Ω	95-1720					

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ZENITH PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	49-838	4A1	

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M1	Tuning Cap.	22-3240	2 Gang (Ant. 17-354mmf, Osc. 12-102mmf)
M2	Clock	172-20	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

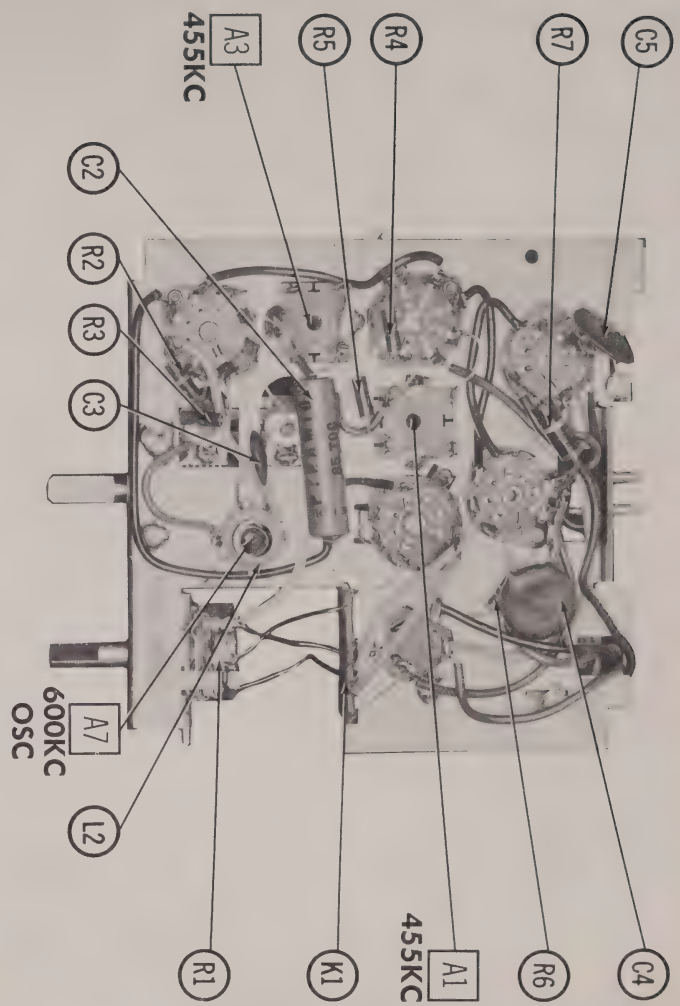
NAME	PART NO.	DESCRIPTION
Knob	S-48214	Tuning And Dial Assembly, Model E514L
Knob	S-48215	Tuning And Dial Assembly, Model E514B
Knob	S-48216	Tuning And Dial Assembly, Model E514V
Knob	S-48217	Tuning And Dial Assembly, Model E514W
Knob	46-2144	Volume, Model E514L
Knob	46-2145	Volume, Model E514W
Knob	46-2146	Volume, Model E514B
Knob	46-2337	Volume, Model E514V
Knob	46-2332	Clock, Models E514L, E514W
Knob	46-2333	Clock, Models E514B, E514V
Crystal	192-289	Clock
Scale	26-659	Clock Dial, Model E514L
Scale	26-660	Clock Dial, Model E514W
Scale	26-661	Clock Dial, Model E514B
Scale	26-662	Clock Dial, Model E514V
Cabinet	14-2897	Plastic, Model E514L
Cabinet	14-2898	Plastic, Model E514W
Cabinet	14-2899	Plastic, Model E514B
Cabinet	14-2900	Plastic, Model E514V

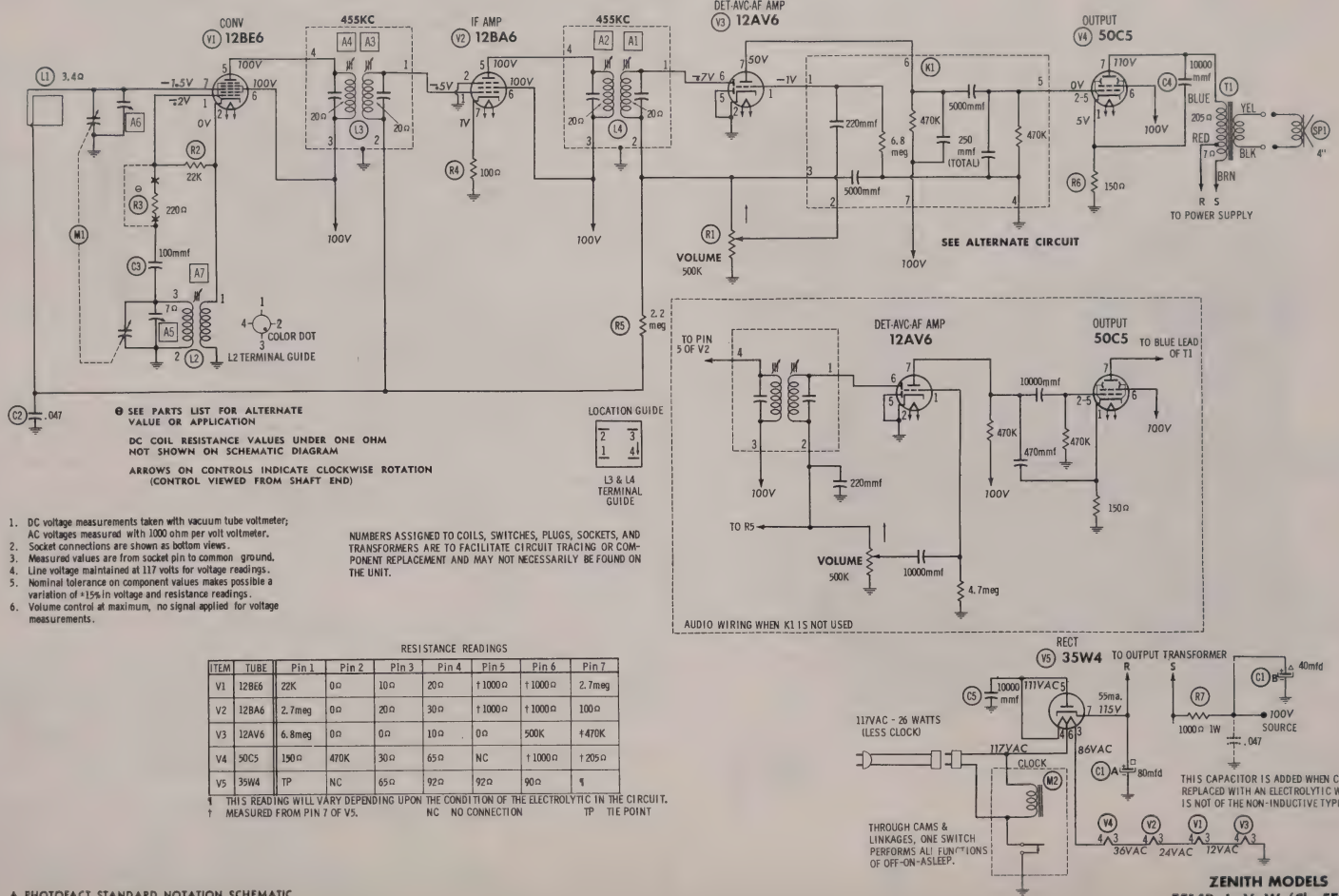
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord (Interlock Type) ..... Use BELDEN No. 8874

CHASSIS—BOTTOM VIEW





❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	0Ω	10Ω	20Ω	†1000Ω	†1000Ω	2.7meg
V2	12BA6	2.7meg	0Ω	20Ω	30Ω	†1000Ω	†1000Ω	100Ω
V3	12AV6	6.8meg	0Ω	0Ω	10Ω	0Ω	500K	†470K
V4	50C5	150Ω	470K	30Ω	65Ω	NC	†1000Ω	†205Ω
V5	35W4	TP	NC	65Ω	92Ω	92Ω	90Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V5. NC NO CONNECTION TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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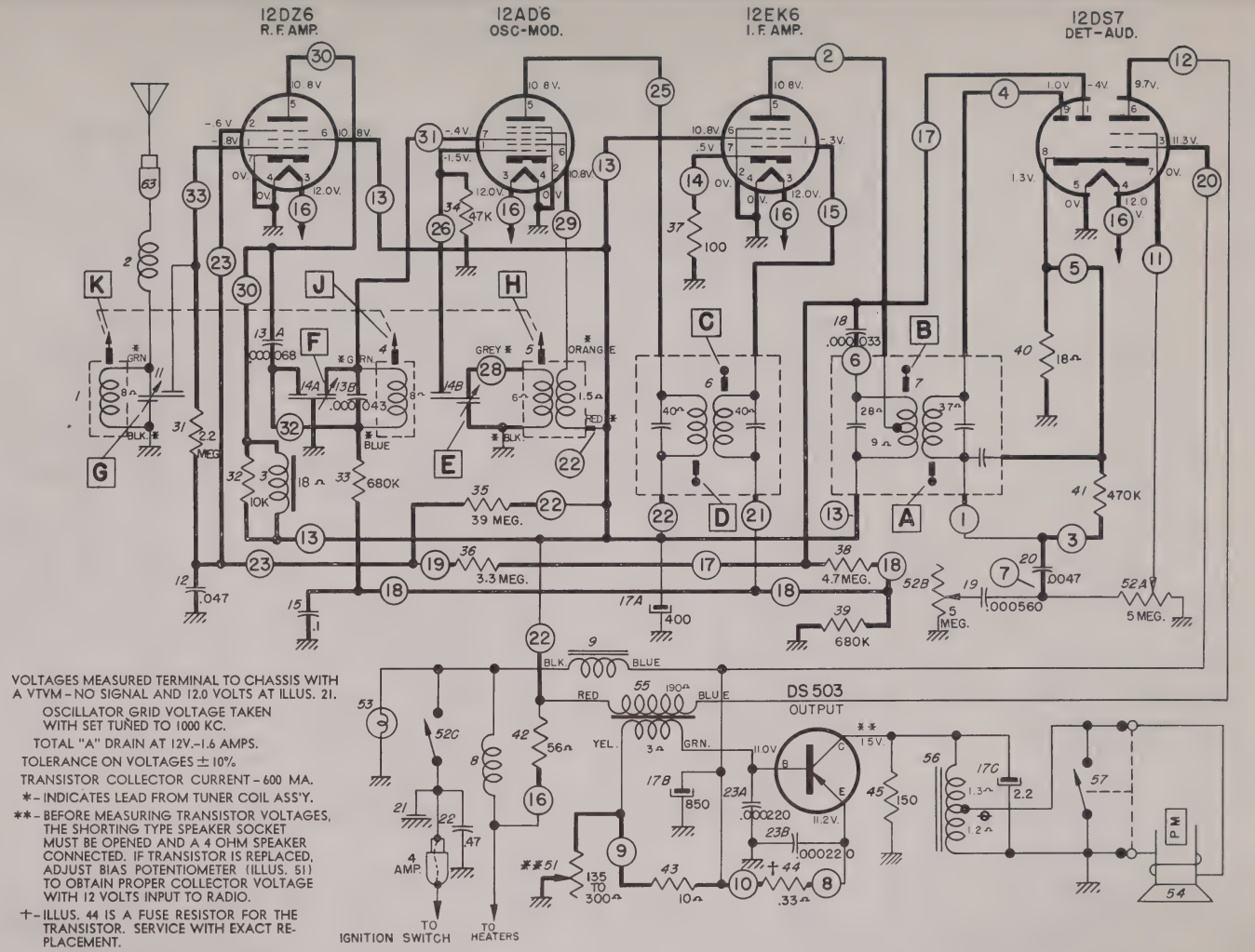
ZENITH MODELS
E514B, L, V, W (Ch. 5E04)

STUDEBAKER MODELS AC-3084, AC-3086



VOLTAGES MEASURED TERMINAL TO CHASSIS WITH A VTVM – NO SIGNAL AND 12.0 VOLTS AT ILLUS. 21.

OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.

TOTAL "A" DRAIN AT 12V.–1.6 AMPS.

TOLERANCE ON VOLTAGES ± 10%

TRANSISTOR COLLECTOR CURRENT – 600 MA.

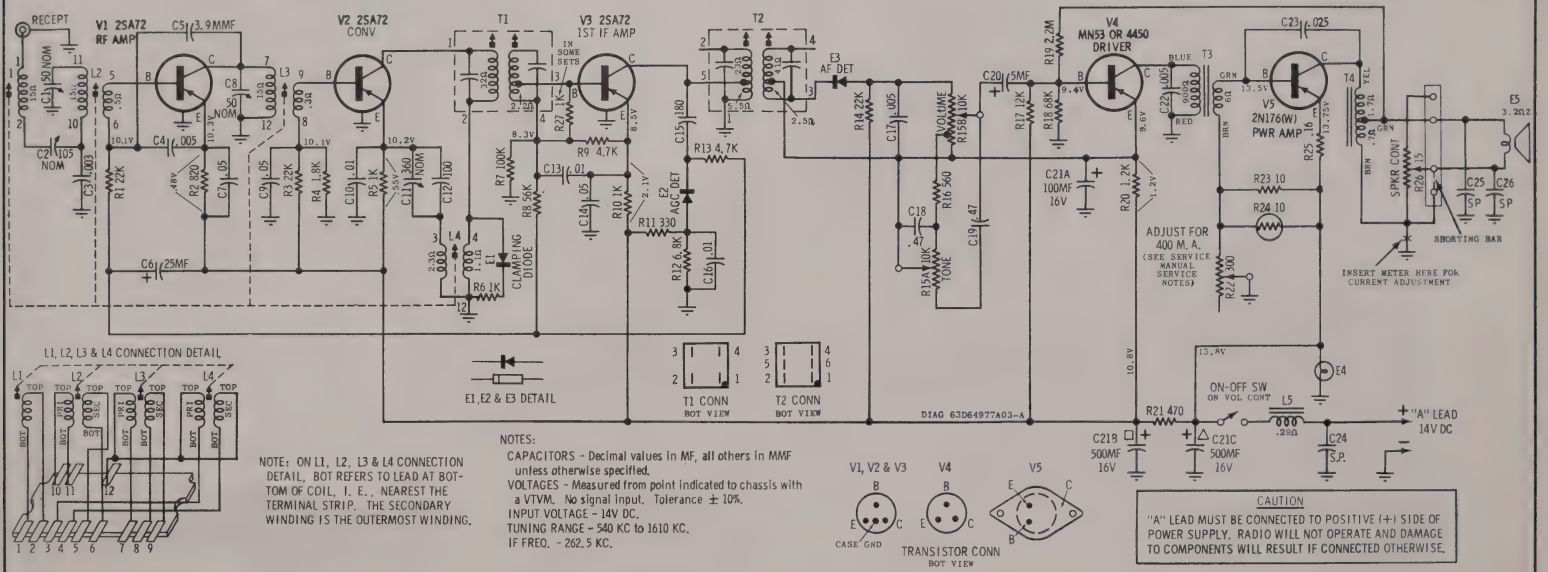
* – INDICATES LEAD FROM TUNER COIL ASS'Y.

** – BEFORE MEASURING TRANSISTOR VOLTAGES, THE SHORTING TYPE SPEAKER SOCKET MUST BE OPENED AND A 4 OHM SPEAKER CONNECTED. IF TRANSISTOR IS REPLACED, ADJUST BIAS POTENTIOMETER (ILLUS. 51) TO OBTAIN PROPER COLLECTOR VOLTAGE WITH 12 VOLTS INPUT TO RADIO.

+ – ILLUS. 44 IS A FUSE RESISTOR FOR THE TRANSISTOR. SERVICE WITH EXACT REPLACEMENT.

⊖ – OUTPUT TRANSFORMER WILL APPEAR SHORTED IF SHORTING TYPE SPEAKER SWITCH IS NOT HELD OPEN.

Schematic Diagram Courtesy of Delco Radio Div., General Motors Corp.



NOTE: ON L1, L2, L3 & L4 CONNECTION DETAIL, BOT REFERS TO LEAD AT BOTTOM OF COIL, I. E., NEAREST THE TERMINAL STRIP. THE SECONDARY WINDING IS THE OUTERMOST WINDING.

NOTES:
CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
VOLTAGES - Measured from point indicated to chassis with a VTVM. No signal input. Tolerance ± 10%.
INPUT VOLTAGE - 14V DC.
TUNING RANGE - 540 KC to 1610 KC.
IF FREQ. - 262.5 KC.

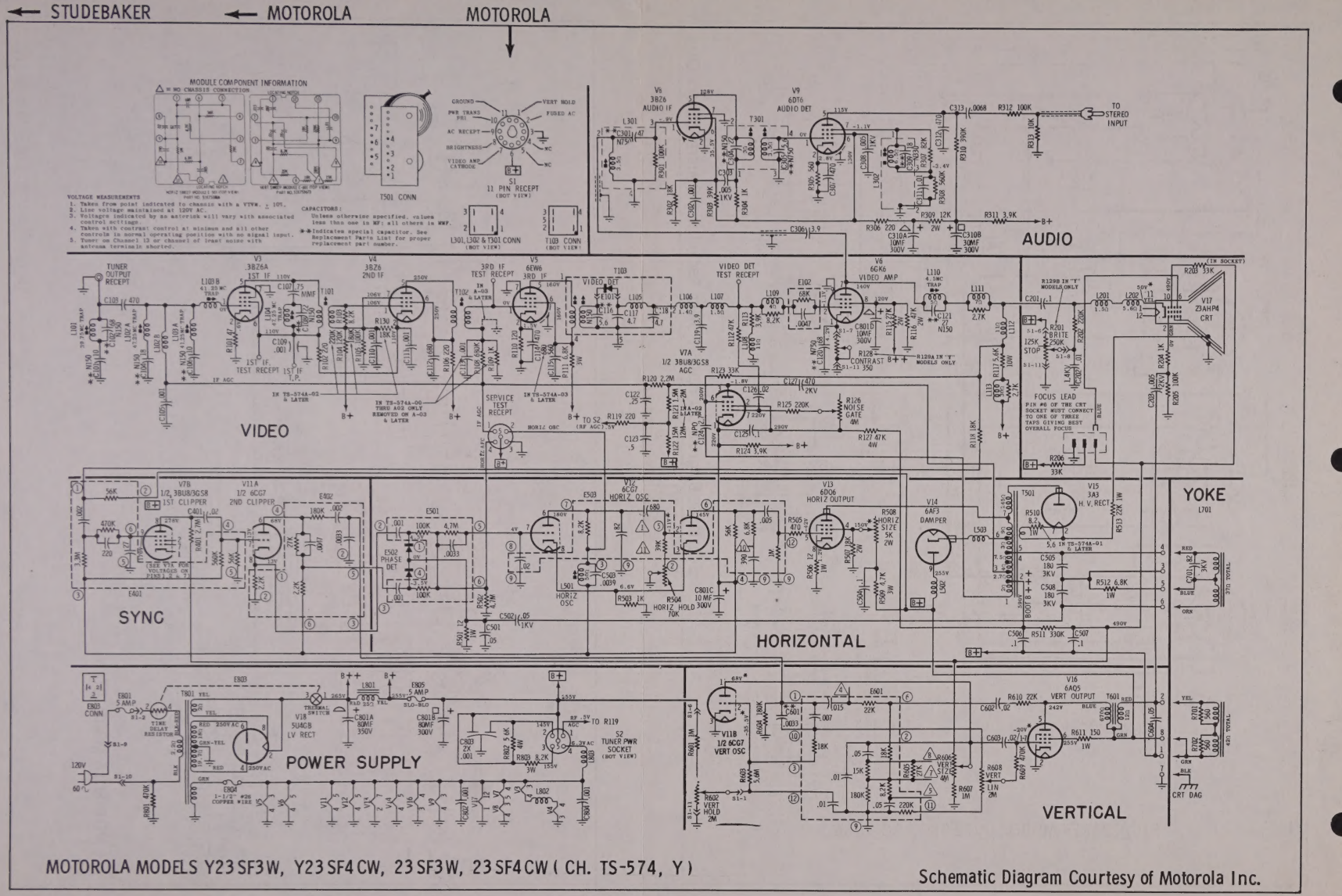
CAUTION

"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.

MOTOROLA MODEL CTA61

Schematic Diagram Courtesy of Motorola Inc.

← STUDEBAKER ← MOTOROLA MOTOROLA


MODULE COMPONENT INFORMATION
VOLTAGE MEASUREMENTS
1. Taken from point indicated to chassis with a VTVM, ± 10%.
2. Line voltage maintained at 120V AC.
3. Voltages indicated by no asterisk will vary with associated control settings.
4. Taken with contrast control at minimum and all other controls in normal operating position with no signal input.
5. Tuner on Channel 13 or channel of least noise with antenna terminals shorted.
CAPACITORS:
Unless otherwise specified, values less than one in MF; all others in MMF.
**Indicates special capacitor. See Replacement Parts List for proper replacement part number.
T501 CONN
S1 11 PIN RECEPT (BOT VIEW)
L301, L302 & T301 CONN (BOT VIEW)
T103 CONN (BOT VIEW)
S2 TUNER PWR SOCKET (BOT VIEW)
TO STEREO INPUT
AUDIO
VIDEO
SYNC
HORIZONTAL
VERTICAL
POWER SUPPLY
YOKE
TUNER OUTPUT RECEPT
SERVICE TEST RECEPT
FOCUS LEAD
CONTRAST
BRITE
HORIZ HOLD 70K
VERT HOLD 2M
VERT SIZE 5K
HORIZ SIZE 5K
VERT LIN 2M
CRT DAG

MOTOROLA MODELS Y23SF3W, Y23SF4CW, 23SF3W, 23SF4CW (CH. TS-574, Y)

Schematic Diagram Courtesy of Motorola Inc.

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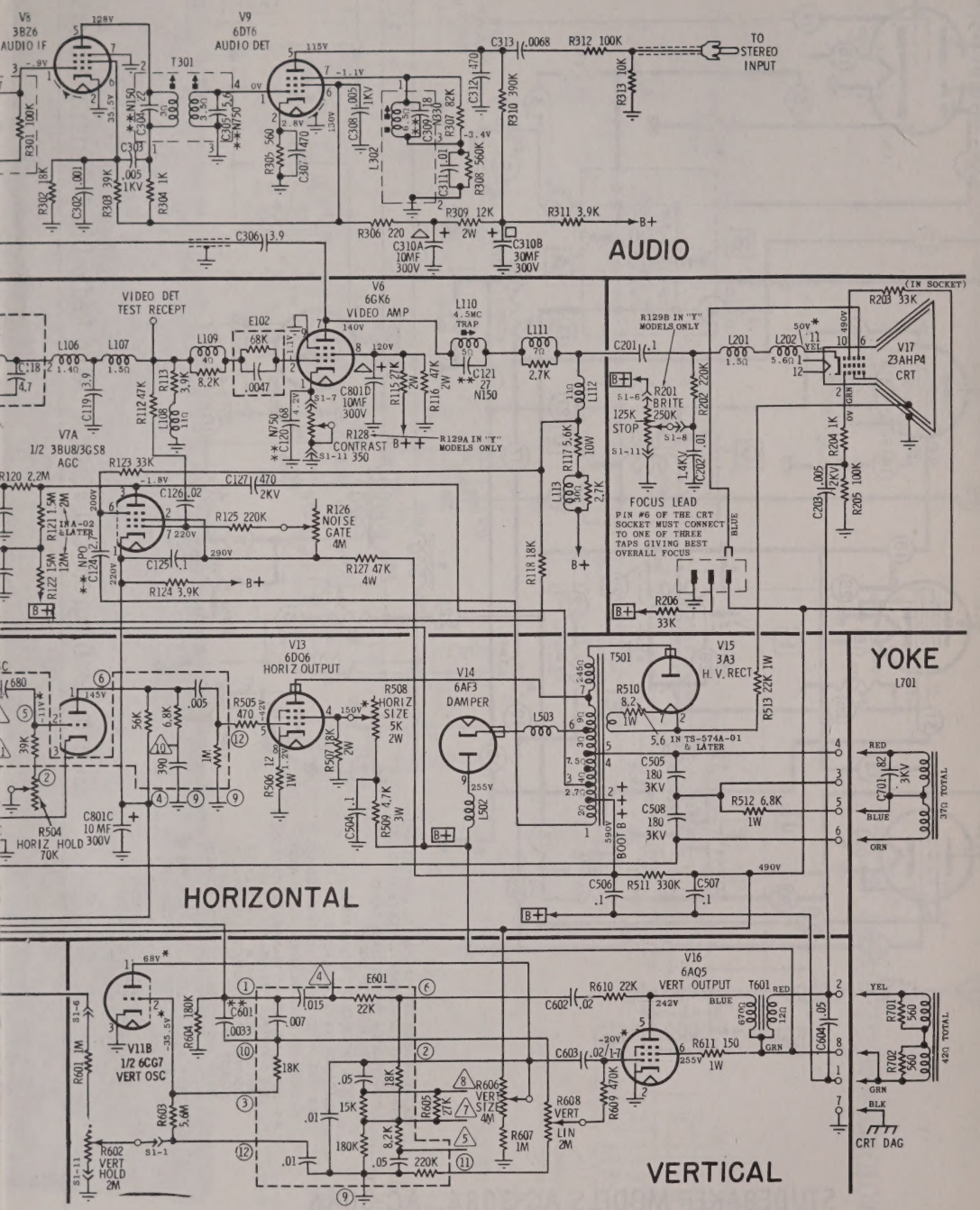

'4, Y)

Schematic Diagram Courtesy of Motorola Inc.